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### Examining the Effect of Medical Risk, Parental Stress, and Self-Efficacy on Parent Behaviors and the Home Environment of Premature Children

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EXAMINING THE EFFECT OF MEDICAL RISK, PARENTAL STRESS, AND  
SELF-EFFICACY ON PARENT BEHAVIORS AND THE  
HOME ENVIRONMENT OF PREMATURE CHILDREN

by

Kathryn E. Woods

A DISSERTATION

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In Partial Fulfillment of Requirements

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Major: Psychological Studies in Education

Under the Supervision of Professor Susan M. Sheridan

Lincoln, Nebraska

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EXAMINING THE EFFECT OF MEDICAL RISK, PARENTAL STRESS, AND  
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Kathryn E. Woods, Ph.D.

University of Nebraska, 2011

Advisor: Susan Sheridan

The purpose of this study was to examine the relationship between medical risk and parenting stress and the extent to which parental self-efficacy moderates the relationship between medical risk, parenting stress, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children. Participants included 72 parent-child dyads with premature children between the ages of 7 and 35 months corrected age. Measures included parent reports of medical risk, stress, self-efficacy, and the IT-HOME. Results show that medical risk was not significantly related to parenting stress. Analyses indicated that parental self-efficacy influenced the relationship between medical risk and acceptance of child and organization of the environment. Parental self-efficacy was also found to effect the relationship between parenting stress and variety in experience. Implications for early intervention service providers and NICU developmental follow-up programs will be discussed along with limitations and areas for future research.

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## CHAPTER 1

### Introduction

In the United States, nearly thirteen percent of all children are born premature (National Center for Health Statistics, 2008). The definition of prematurity is typically based on a child's gestational age (i.e., born before 37 weeks of pregnancy), though prematurity may also be defined in terms of a child's birthweight (Amiel-Tison, Allen, Lebrun, & Rogowski, 2002). Low birthweight (LBW) refers to infants born weighing less than 2,500 grams, or 5 pounds and 5 ounces; very low birthweight (VLBW) refers to infants born weighing less than 1,500 grams, or 3 pounds 3 ounces; extremely low birthweight (ELBW) refers to infants born weighing less than 1,000 grams, or 2 pounds 2 ounces; and micropremies refer to children born weighing less than 500 grams, 1 pound 1 ounce (Aylward, 2003). Despite the fact that advances in medical technology have dramatically improved survival rates for children born premature, effective strategies to prevent premature deliveries have yet to be discovered (Goldenberg & Rouse, 1998; Institute of Medicine, 2006). Given that the incidence of premature births is not decreasing at this time, efforts can be made to better understand factors that contribute to improved well-being for premature children and their families.

The negative consequences associated with prematurity are evident at a young age and may subsist across a variety of domains. Premature children frequently experience medical conditions in the form of asthma, seizures, hydrocephaly, intraventricular hemorrhage (IVH), respiratory problems, and gastrointestinal and immune system concerns (Hack, Klein, & Taylor, 1995; Maccow, Howard, & Swerdlik, 2006; Wood, Marlow, Costeloe, Gibson, & Wilkinson, 2000). Developmental impairments common to premature children include perceptual, visual-motor, and hearing difficulties (Foulder-Hughes & Cooke, 2003; Goyen, Lui, & Woods, 1998;



Repka, 2002), impaired language development (Lindgren, Harper, & Blackman, 1986; Wolke & Meyer, 1999), social skills delays (Landry, Chapieski, Richardson, Palmer, & Hall, 1990; Landry, Smith, Miller-Loncar, & Swank, 1998), cognitive impairments (Taylor, Klein, & Hack, 2000), attention problems (Botting, Powls, & Cooke, 1997; Breslau & Chilcoat, 2000), a higher prevalence of externalizing behaviors (Bhutta, Cleves, Casey, Craddock, & Anand, 2002), impaired social competence and adaptive behaviors (Breslau, Klein, & Allen, 1988; Szatmari, Saigal, Rosenbaum, & Campbell, 1993) and increased levels of anxiety and depression (Maccow et al., 2006). Premature children are also more likely to receive special education services (Saigal, Stopskopf, Streiner, & Burrows, 2001), repeat one or more grades (Klebanov, Brooks-Gunn, & McCormick, 1994), and have learning difficulties in the areas of reading, writing, math, or spelling (Aylward, 2002; O'Callaghan et al., 1996) than full-term peers. Outcomes experienced by premature children frequently persist and may even worsen over time. Premature children often continue to experience academic, behavior, cognitive, neurodevelopmental, social skills, and socioemotional impairments into adolescence and young adulthood as well as increased rates of health and developmental problems (Hack et al., 2002; Hack, Taylor, Klein, & Minich, 1999; Monset-Couchard, de Bethmann, & Kastler, 1996). Declines in academic and cognitive scores during premature children's school-age years have also been observed in longitudinal studies comparing outcomes experienced by preterm children and full-term controls (Botting & Marlow, 1998; Cohen et al., 1996; Kalmar, 1996).

As researchers strive to understand the divergent consequences of prematurity, studies have begun to investigate environmental risk factors as they relate to outcomes experienced by premature children and their families. Examining the impact of medical and environmental risk is particularly important for premature children as this population is frequently referred to as a

“double hazard” to represent the combination of medical and environmental risk factors that premature children and their families frequently experience (Escalona, 1982; Parker, Greer, & Zuckerman, 1988). Due to the increased frequency at which premature children are exposed to biologic and environmental risk factors, researchers have the unique opportunity to examine the respective contribution of each risk factor, as well as how these risk factors interact to affect the functioning of premature children and their family members.

The role of process and distal environmental variables has been examined in relation to developmental outcomes experienced by premature children. Process variables include aspects of the environment that the child directly experiences (e.g., maternal stress, social supports, parent-child interactions) and distal environmental variables include factors that a child indirectly experiences throughout their life (e.g., maternal education, occupational status, social class, family size; Minuchin, Rosman, & Baker, 1978). Process variables have been shown to be predictive of early developmental outcomes while distal variables are more predictive of outcomes experienced at school-age or later (Alyward, 1996). The cumulative effects of multiple process and distal variables often increase the odds that a child will experience less than optimal developmental outcomes than the effect of any single risk factor (Sameroff, 2000; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). Cumulative psychosocial risk has been significantly related to lower cognitive scores among premature children at 13 years of age (Sameroff, Seifer, Baldwin, & Baldwin, 1993), lower scores in expressive and receptive language domains (Hooper, Burchinal, Roberts, Zeisel, & Neebe, 1998), increased internalizing and externalizing behaviors in 2, 4, and 8 year olds (Laucht, Esser, & Schmidt, 2001), and delayed infant development (Laucht, Esser, & Schmidt, 1997). In spite of these findings, few studies have examined the impact of cumulative medical and environmental risk factors with

regard to outcomes experienced by parents of premature children; specifically researchers have not been able to consistently document the effects of prematurity on parenting stress, cognitions, and behaviors. Examining the relative contributions of a child, his or her caregiver, and his or her environment is an area in need of future investigation particularly among children born premature. As biological risk factors often cannot be changed, and parental factors may exert a greater influence in determining parent-child relationships than infant risk factors (Goldberg, 1988), increased understanding is needed with regard to the caregiver's role in preventing the development of behavior problems by exhibiting quality behaviors during interactions with biologically vulnerable children, such as those born premature (Assel et al., 2002).

It is important to note that the effects of a premature birth are not only experienced by children but also by their parents. Due to events associated with their child's birth and health status, parents of preterm infants frequently report increased symptoms of stress (Lau & Morse, 2003), depression (Miles, Holditch-Davis, Schwartz, & Scher, 2007), and anxiety (Gennaro, York, & Brooten, 1990) compared to parents of children born full-term. Parents of premature children with a younger gestational age and lower birthweight often report increased psychological concerns (Cronin, Shapiro, Casiro, & Cheang, 1995). The experience of having a premature child can be particularly difficult for mothers. Mothers of premature children have reported symptoms of posttraumatic stress syndrome (Holditch-Davis, Bartlett, Blickman, & Miles, 2003) and greater symptoms of stress in relation to fathers following their child's birth (Lahner & Hayslip, 2003).

The emotional strain and stressors commonly associated with having a premature child may not only affect a parent's psychological well-being, but also the behaviors that parents exhibit during interactions with premature children. Parents of premature children may engage

in more negative interactions with their children than mothers of full-term children (Harrison & Magill-Evans, 1996). Parents of premature children may work harder to initiate and maintain interactions though they receive fewer positive responses from their child (Singer et al, 2003). This interaction sequence may result in a parent being less sensitive and responsive to their child's cues (Jarvis, Myers, & Creasey, 1989) and engaging in behaviors that are not in accordance with their child's developmental needs (Schmucker et al., 2005). Such patterns may then disrupt parent-child attachment patterns and the obtainment of mutually satisfying relationships for both the parent and child. Interaction difficulties may be more pronounced for premature children with significant medical complications (Fiese, Poehlmann, Irwin, Gordon, & Curry-Bleggi, 2001).

Parents also may exhibit more positive behaviors during interactions with premature children. Investigations have found that mothers of sick premature children demonstrated more responsivity, involvement, more appropriate control, gestured to and touched their child more, and spent more time interacting with premature children than mothers of non-chronically ill premature children (Holditch-Davis, Cox, Miles, & Belyea, 2003; McGrath, Sullivan, & Seifer, 1998). Parents may exhibit more positive social behaviors to compensate for their child's immaturity and lack of responsiveness (Magill-Evans & Harrison, 1999). The reasons as to why some parents of premature children exhibit quality interactions with their children and others do not are unclear. Examining possible moderators for the relation between child medical needs, parental stress, and parenting behaviors may be particularly important in families who are at-risk for poor parent-child interactions, such as those of children born premature.

Research investigating parent interpersonal characteristics, such as self-efficacy, is a fruitful venue for future research with parents of premature children as parenting self-efficacy

may buffer against the adverse effects of prematurity to foster resilience in families, improve family functioning, and promote positive outcomes for parents and children. Parent self-efficacy is described as the beliefs or judgments one has about their ability to parent successfully and positively influence their child's development (Bandura, 1982). Parent self-efficacy has been shown to predict the behaviors parents will engage in when caring for their child, and the extent to which parents will persist with difficult child-rearing tasks. Parents with a higher sense of self-efficacy are more likely to persist when faced with difficult tasks and are more likely to regain their sense of efficacy after an unsuccessful outcome (Bandura, 1982). Parent self-efficacy is also negatively related to coercive parenting and is positively related to parental responsiveness, involvement, and monitoring (Gondoli & Silverberg, 1997; Shumow & Lomax, 2002). When investigated among parents of premature children, research has found that self-efficacy beliefs tend to be lower than those of mothers of full-term infants when infants are younger and closer to the event of the preterm birth (Gross, Rocissano, & Roncoli, 1989). Research has yet to explore the relationship between parental stress, self-efficacy, and behaviors exhibited by parents of premature children. Understanding the connections between these factors may provide insight into protective factors that improve health and developmental outcomes for premature children. Ecological, social cognitive, and transactional theories provide a framework for understanding the relationship between these variables.

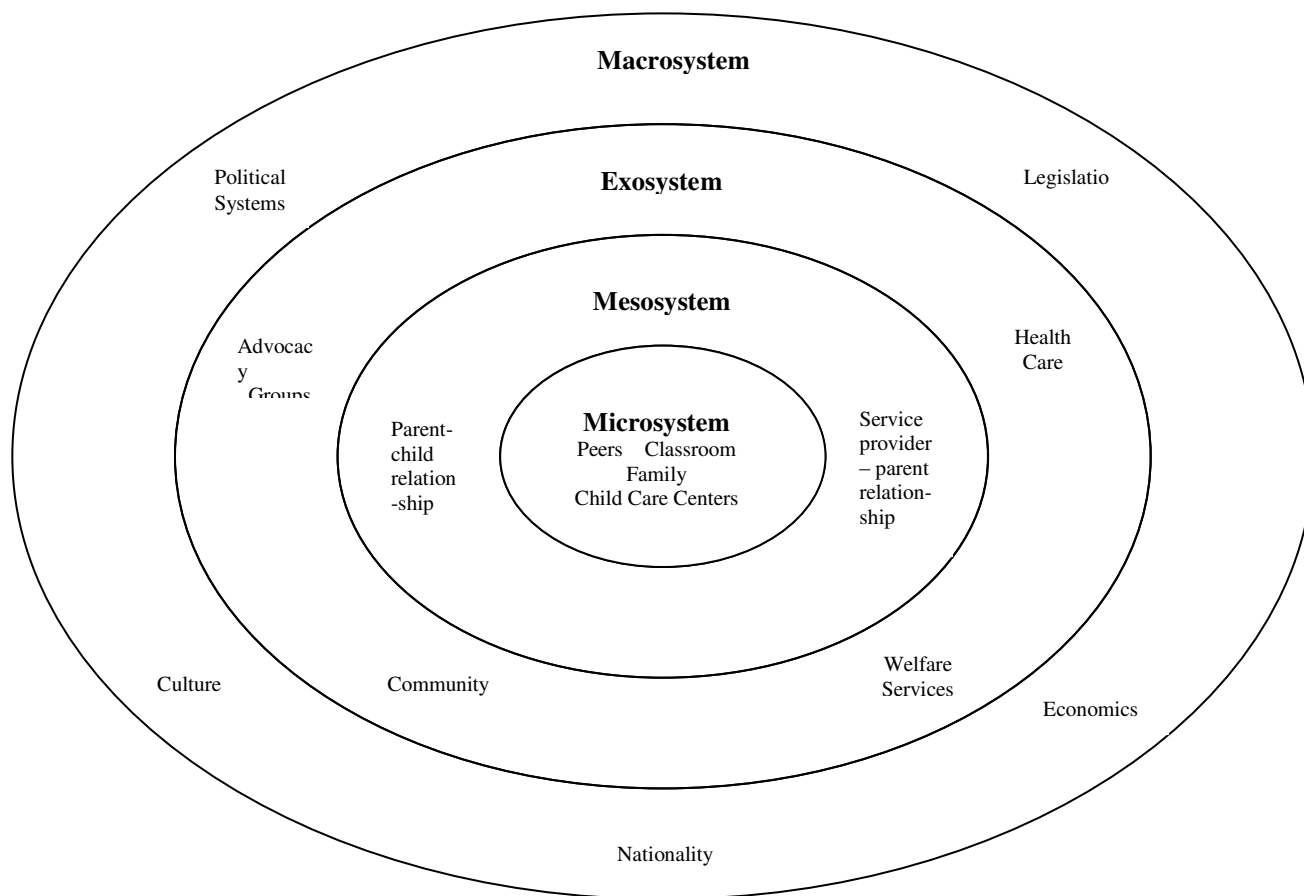
### *Ecological Systems Theory*

Ecological systems theory recognizes that child growth and development is the result of many complex exchanges between the systems, environments, and contexts within which children and families function. The birth of a child will influence the family system along with the wider circle of systems present throughout the child's community which will in turn

influence the child's future development. Ecological systems theory highlights the notion that a child is embedded in a larger social system with five interrelated systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem (See Figure 1; Bronfenbrenner, 1979). The microsystem consists of proximal social and environmental contexts in which children and families most frequently exist. This includes settings in which children have the most frequent level of contact (e.g., home and school) and individuals with whom children interact with and create relationships with in these settings (e.g., parents, grandparents, child care providers). The mesosystem involves relationships between key individuals in a child's microsystem, such as relationships among a child and their parent, a family and a child's teacher, and health professionals and a family. The exosystem includes the larger social system in which a child functions but does not directly participate. Each system indirectly impacts child development by interacting with structures in the child's microsystem (e.g., parent's place of employment) and mesosystem (e.g., relationships between parents and health professionals). The macrosystem consists of cultural values, laws, and customs that influence interactions among all other systems. For example, a publicly funded program such as Medicaid influences the type and amount of services that families of premature children will be able to access and receive. Finally, the chronosystem includes the concept of time as it relates to a child's environment. Elements at the chronosystem level include physiological changes that occur as a child ages and the timing of a parent's death. At this level, a child may respond differently to environmental changes and may take a more active role in determining how their environment influences them as they age.

At the center of the multiple systems of influence is a specific child with a unique set of characteristics (e.g., gender, temperament, healthcare needs) and behaviors that interact with individuals and environmental factors over time to impact their development. Among the many

Figure 1. Bronfenbrenner's Ecological Systems Theory



interactions that occur between the child and the individuals and environments that surround them, interactions present at the mesosystem level consisting of the exchanges between a parent and child have significant implications for a child's growth and development; the explanation for why some infants born prematurely are more resilient than others may lie in these exchanges (Kuczynski, 2003). Adaptive parent-child interactions characterized by mutual attention, positive affect, engagement, and reciprocity have been shown to predict positive socioemotional and cognitive outcomes (Estrada, Arsenio, Hess, & Holloway, 1987; NICHD Early Child Care

Research Network, 1999), whereas maladaptive interactions involving intrusiveness, noncontingent responding, and negative affect may place a child at-risk for later developmental and behavior problems (Bakeman & Brown, 1980; Stomshak et al., 2000). Ecological theories of child development emphasize that the social and psychological status of parents has a direct influence on how they interact with their children (Mahoney & Wheeden, 1997). As a result, it is important to identify parent characteristics, such as psychological and familial factors, that influence a child's development and one's ability to provide a supportive and enriching environment to facilitate their child's growth and well-being over time. Parental self-efficacy is one factor by which successful parent-child relationships can be achieved through the display of quality behaviors during interactions between parents and children (Izzo, Weiss, Shanahan, Rodriguez-Brown, 2000). Parental self-efficacy is best understood from a social cognitive framework.

### *Social Cognitive Theory*

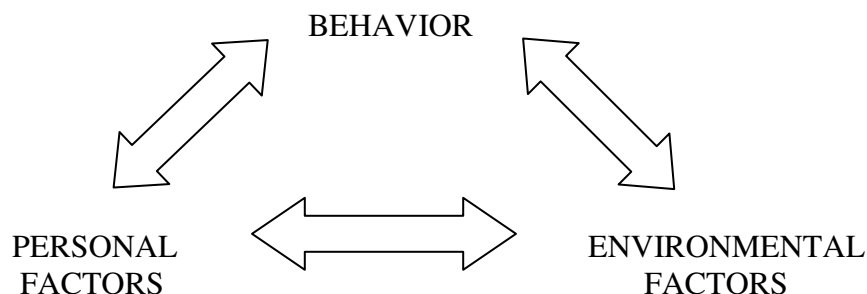
Ecological systems theory highlights the role of one's environment in shaping child outcomes. Social cognitive theory asserts that people are not shaped or controlled by their environment but by their own affect, beliefs, and cognitions (Bandura, 1986). This theory emphasizes the cognitive, self-regulatory, and self-reflective processes that affect individual behavior and claims that individuals are able to exercise control over their environment through their own actions and beliefs as opposed to simply being reactive to environmental forces (Grusec, 1992). Social cognitive theory recognizes that one's environment maintains a strong influence on one's behavior, but also notes that individual cognitions are the primary factor in determining people's ability to construct their own realities and control their behavior.



Social cognitive theory acknowledges that interactions among personal factors (e.g., affect, biological events, and cognitions), behaviors (e.g., parenting skills to support child functioning), and environmental influences (e.g., structures within the home to support child development) shape human functioning (See Figure 2; Bandura, 1986). These three factors form a model of causation referred to as triadic reciprocity which posits that personal factors, behaviors, and environmental influences interact to affect one another in a bidirectional manner. Bandura (1989) states that reciprocal causation does not mean that each source of influence is of equal strength or that separate sources of influence are occurring simultaneously, but does imply that an individual is an active contributor to one's own motivation, behavior, and development within a network of reciprocally interacting influences. Environmental factors (e.g., socioeconomic status, family structure, economic conditions, educational status) do not directly influence human behavior but such factors stimulate behavior change by operating through psychological mechanisms such as self-efficacy beliefs, personal standards, and individual aspirations (Bandura, 1993).

Self-efficacy plays a central role in human agency and the cognitive and emotional reactions that people experience in their daily lives (Bandura, 1982). Self-efficacy is defined as the beliefs one holds with regard to their ability to perform a particular task successfully to produce a desired outcome (Bandura, 1977). This belief is the key motivator behind one's actions. Unless an individual believes that they are able to produce positive outcomes through one's behavior, it is unlikely that they will feel motivated to act to overcome personal difficulties. Self-efficacy beliefs not only have important implications for the behaviors one will exhibit but also how they will act with the skills and personal knowledge they possess. Social cognitive theory also suggests that personal beliefs are a better predictor of individual behaviors

Figure 2. Bandura's Social Cognitive Theory



than what might be suggested by an individual's innate capacities.

Judgments of personal efficacy also affects the behaviors a person will exhibit in terms of what activities people will pursue, how much effort people will expend in activities, and how long they will persist in the face of obstacles or aversive experiences (Bandura, 1994). People with high beliefs in their capabilities will approach difficult tasks as challenges to be mastered rather than threats to be avoided. These individuals will set challenging goals for themselves, maintain a strong commitment to accomplishing them, are likely to persist in the face of failure, and quickly recover their sense of efficacy after facing failure or setbacks. Personal failure is then attributed to insufficient effort or knowledge, which they may be able to obtain at a later time.

Individuals rely on a number of experiences and emotional states when interpreting their ability to perform a particular task (Bandura, 1994). Emotional arousal in the form of stress reactions is an important source of information that can affect perceived self-efficacy in coping with threatening situations. Signs of stress or tension may be interpreted as vulnerability to poor performance and depending on how such reactions are interpreted, individual effort to complete a specific task may be reduced. For example, individuals with high self-efficacy are likely to view affective arousal as an energizing experience, whereas those with low self-efficacy may

view their arousal as quite stressful. Those who interpret stress as a sign of weakness may be more likely to refrain from engaging in difficult tasks, give up when faced with adversity, and make additional internal attributions for failure.

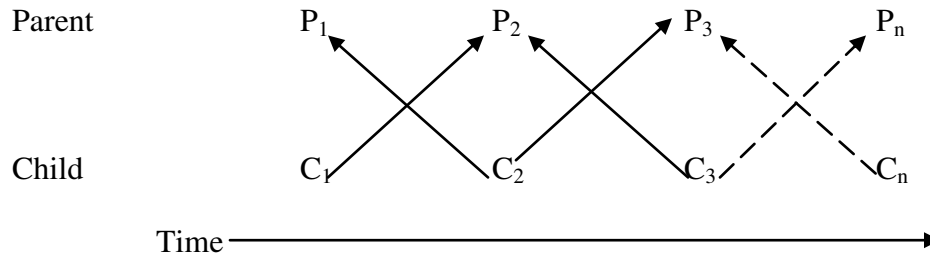
Parent self-efficacy is a specific domain of self-efficacy that is characterized as a parent's perception of their ability to positively influence child outcomes (Hess, Teti, & Hussey-Gardner, 2004). Parents with high self-efficacy experience an easier transition to motherhood (Williams et al., 1987) and are more likely to (a) demonstrate responsiveness to child needs (Donovan & Leavitt, 1985; Donovan, Leavitt, & Walsh, 1997); (b) engage in quality parenting interactions (Mash & Johnston, 1983; Miller-Heyl, MacPhee, & Fritz, 1998); (c) establish an adaptive, stimulating, and nurturing child-rearing environment (Coleman & Karraker, 2000); (d) display nonpunitive parenting behaviors (Donovan & Leavitt, 1985; Unger & Waudersman, 1985); (e) exhibit acceptance of child needs (Dumka, Stoerzinger, Jackson, & Roosa, 1996); (f) use active coping strategies when faced with adversity (Wells-Parker, Miller, & Topping, 1990); (g) experience lower rates of maternal depression (Gross, Conrad, Fogg, & Wothke, 1994); and (h) report satisfaction with social supports (Teti, O'Connell, & Reiner, 1996). Low feelings of parental self-efficacy have been associated with parental defensive and controlling behaviors (Donovan, Leavitt, & Walsh, 1990), greater perceptions of child behavior problems (Halpern, Anders, Coll, & Hua, 1994), high levels of parental stress (Wells-Parker et al., 1990), and a passive coping style (Wells-Parker et al., 1990). Parents with low beliefs in their efficacy as caregivers are also more likely to focus on relationship difficulties (Bugental & Shennum, 1984) and are more likely to report feelings of depression and frustration with their parenting skills (Jones & Prinz, 2005; Teti & Gelfand, 1991).

Bandura's social cognitive theory has important implications for understanding the behaviors that parents will exhibit during interactions with premature children. Parent self-efficacy in particular is a construct worthy of continued investigation in this population as this concept has been shown to be related to positive parenting practices and may protect against risk factors such as elevated stress and disadvantaged environmental conditions that premature children are frequently exposed (Cutrona & Troutman, 1986). As factors present in a child's environment and within their caregivers has greater impact on developmental outcomes than perinatal complications (Aylward, Verhulst, & Bell, 1989; Lee & Barratt, 1993; Liaw & Brooks-Gunn, 1993), it is timely to investigate variables that contribute to parental behavior, such as parental stress and beliefs, to better understand the behaviors exhibited by parents of children born premature.

#### *Transactional Theory*

Transactional theory draws attention to the unique ability of parents and a child's environment to influence developmental outcomes. Transactional theory recognizes that children and the parent-child relationship are imbedded in the family context and develop in a reciprocal, bidirectional manner over time (Sameroff & Fiese, 2000). Within this theory, equal emphasis is placed on the unique contributions of the child and their environment toward the attainment of developmental outcomes and the recurrent, reciprocal interchanges between parents and children over time (Sameroff, 1975; Sameroff & Chandler, 1975). Each social partner responds to the behavior of the other member and through their response, subsequent behavior may be changed (See Figure 3; Sameroff, 2004). With time, through the process of social interaction and bidirectional influences, parents and children learn to adapt, adjust, and modify their behavior in response to their interaction partner (Barnard, 1997). This is

Figure 3. *Transactional process with reciprocal effects between the child and parent over time.*



particularly relevant for the interaction sequences among parents and children born premature as a premature birth may cause an otherwise calm mother to become anxious about her child's well-being and skills as a caretaker (Sameroff, 2004). Feelings of anxiety in the first months of a child's life may cause a mother to be uncertain and inappropriate in her interactions with her child and in response to such inconsistencies, the infant may develop difficulties eating and sleeping which may cause the child to appear to have a difficult temperament and poor self-regulation. The child's temperament may then decrease the pleasure a mother experiences spending time with her child and may cause a mother to spend less time engaged with the child in the form of playing, talking, and interacting with the infant. This series of interactions between a child and parent highlights how difficulties associated with prematurity may be extended over time as a result of the interpretations associated with child behavior and parental resources for handling difficult child circumstances. Therefore, to understand the behaviors parents exhibit with their children it is important to acknowledge a parent's perception of their ability to manage circumstances such as difficult child behaviors to improve their interactions over time.

Behaviors exhibited by parents during interactions with their children significantly influence child and parent outcomes. Adaptive parent-child interactions promote the

development of adaptive behavior and social competencies (Landry et al., 1990), improved cognitive abilities (Clarke-Stewart, 1973) and academic performance (Estrada et al., 1987). Parents who possess a positive affect, mutual engagement, reciprocity, are emotionally available to the needs of their child, facilitate reinforcement contingencies, and a sense of support to promote the development positive developmental outcomes (Landry et al., 1990; Muller-Nix et al., 2004). Engaging in quality parent-child interactions also has positive implications for parent functioning. Significant positive changes on parents' self-report of psychopathology and personal stress has been shown to result for parents who exhibit quality behaviors with their children (Hood & Eyberg, 2003). As a parent accumulates a history of positive interactions with their child over time, this dyad will have a context for future positive interactions contributing to the development of a healthy ongoing relationship (Lollis, 2003). With the knowledge that children and parents mutually influence one another throughout their relationship, researchers have begun to examine contributions of both the parent and the child to understand the behaviors exhibited during interactions with one another. By acknowledging the influence of social, familial, psychological, parental beliefs, and values that influence parent-child interactions, intervention efforts may focus on targets in need of modification to improve child and family functioning and health over time.

There is an increasing focus on social and environmental factors that promote and support the development of highly vulnerable children such as those born premature. Ecological, social cognitive, and transactional theories provide a framework for understanding the various contexts in which children develop and how parental well-being, beliefs, and behaviors may affect child functioning. As families are the most central and enduring influence in children's lives and parental characteristics and behaviors account for greater variation in premature child

cognitive and social development than perinatal factors alone (Landry et al., 1990), research investigating the relationship between the health needs of premature children and parent characteristics (e.g., stress, self-efficacy, and behaviors) may provide valuable information to assist in meeting the multifaceted needs of premature children and their families. A comprehensive model testing the hypothesized relationships between parental stress, self-efficacy, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) is needed to better understand the experience of having a premature child and how parental characteristics may promote positive child outcomes.

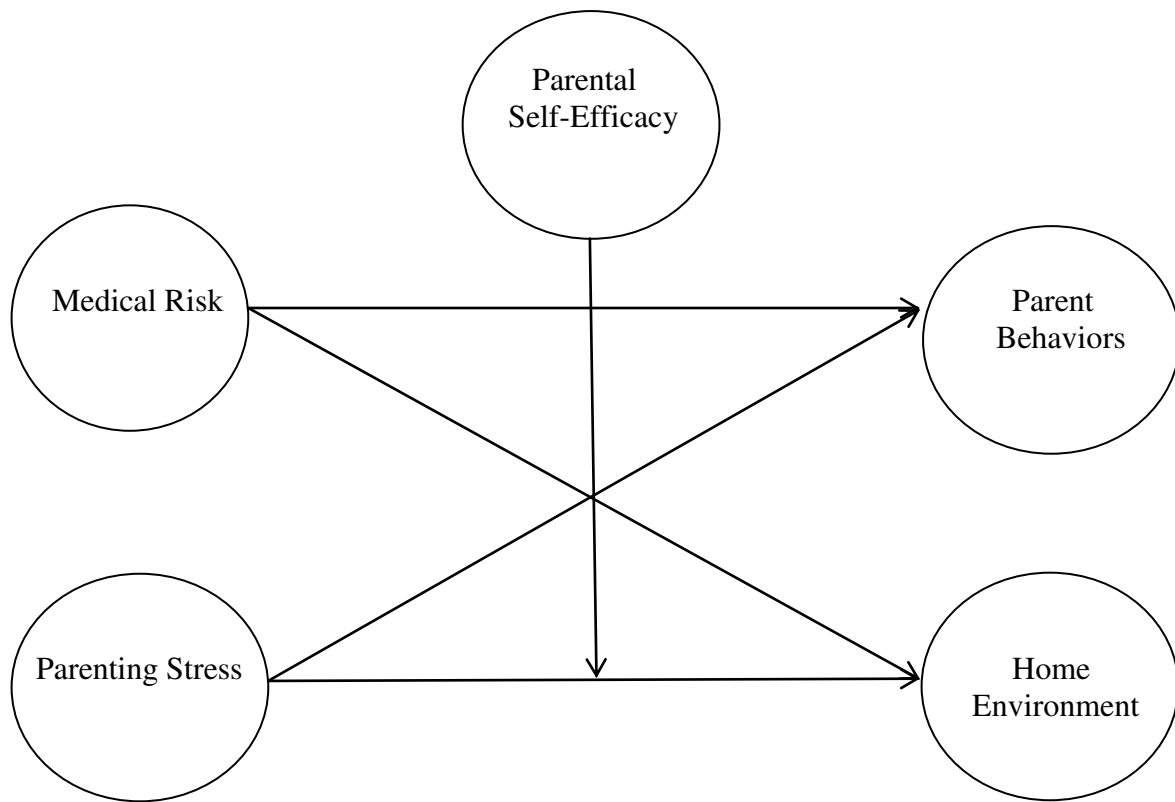
The purpose of this study was to investigate the extent to which parental self-efficacy moderates the relationship between medical risk, parenting stress, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children (See Figure 4). Moderation analyses were conducted using general linear models to examine the extent to which parental self-efficacy moderates the relationship between medical risk, parental stress, parent behaviors, and the home environment of premature children. The following questions were addressed in this study:

1. What is the relationship between medical risk and parenting stress?
2. To what degree does parental self-efficacy moderate the relationship between medical risk, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children?

3. To what degree does parental self-efficacy moderate the relationship between parental stress, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children?



Figure 4. Conceptual Model.



## CHAPTER 2

### Review of Literature

The purpose of this study was to examine the relationship between medical risk, parental stress, parental self-efficacy, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children. Specifically, the relationship between the predictor variables of medical risk and parental stress were explored along with their relation to the outcome variables of specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score). Moderation analyses using general linear models were used to determine if parental self-efficacy moderates the relationship between medical risk and parental stress on parent behaviors and the home environment of premature children. This chapter reviews the current literature related to (a) parental stress, (b) parental self-efficacy, and (c) parenting behaviors.

Each year more than half a million infants in the United States are born premature (Martin et al., 2006) and the rate of preterm births has grown steadily with an increase of 30 percent since 1981 (Institute of Medicine, 2006). Premature children are more likely to experience adverse outcomes in the form of long-term medical complications (Rubin, 2006; Volpe, 2001), behavioral problems (Delobel-Ayoub et al., 2006; Gray, Indurkha, & McCormick, 2004; Mick, Biederman, Prince, Fischer, & Faraone, 2002), cognitive impairments (Bhutta et al., 2002; Horwood, Mogridge, & Darlow, 1998; Marlow, Wolke, Bracewell, & Samara, 2005), and disruptions to their socio-emotional development (Hoff, Hansen, Munck, & Mortensen, 2004; Landry et al., 1990). Though the number and severity of outcomes commonly

experienced by premature children is often inversely related to a child's gestational age and birthweight (Wood et al., 2000), the prognosis for even healthy preterm children is unclear (Moore, Saylor, & Boyce, 1998).

The difficulties associated with parenting a premature child may place a considerable number of demands on parents. Parents of preterm children have reported high levels of stress throughout the first year of their child's life (Majnemer, Shevell, Rosenbaum, Law, & Poulin, 2007) and the level of stress associated with parenting a premature child has shown to be exacerbated among children with a greater number of medical complications and caregiving needs (Singer, Salvator, Guo, Collin, Lilien, & Baley, 1999). Parental stress may also be intensified by the behaviors that premature children exhibit during interactions with their parents. Premature children are often described as challenging social partners as they frequently exhibit behaviors described as irritable, hard to interpret, passive, and difficult to soothe (Beckwith, 1990; Talmi & Harmon, 2003). Parents of premature children may in turn try to compensate for their child's behaviors and exhibit behaviors described as directive (Moore et al., 1998), controlling (Forcada-Guex, Pierrehumbert, Borghini, Moessinger, & Muller-Nix, 2006), negative (Mash & Johnston 1990), and unresponsive to child cues (Harrison & Magill-Evans, 1996).

Parental self-efficacy may serve as a protective factor for parents of premature children experiencing increased levels of stress as increased feelings of self-efficacy have been associated with a number of positive parenting attitudes and behaviors (Landry et al., 1990; Coleman & Karraker, 1997). Few studies have explored the relationship between medical risk, parental stress, parenting behaviors, and the home environment of premature children. Self-efficacy is also a characteristic that is rarely investigated among parents of premature children. Research is needed to understand the relationship between parental stress, parental self-efficacy, behaviors

exhibited by parents, and the home environment of premature children. Understanding the connections between these variables may provide greater insight to the pathways by which prematurity affects parenting and may assist practitioners in designing interventions to meet the needs of premature children and their families.

### *Parental Stress*

The birth of a premature child is a stressful event for many families. In addition to coping with an unexpected medical event, parents frequently experience fear and uncertainty regarding their child's survival, medical condition, and developmental prognosis (Halpern, Brand, & Malone, 2001). Even after this medical crisis has passed, families are now faced with the challenges of caring for a premature infant. Once a premature infant is discharged from the hospital, parents may continue to experience distress as they become responsible for administering procedures, providing medications, and developmental care that was once given in a sophisticated medical environment with a number of professional supports available (Donohue, 2002). As parents experience increased amounts of stress, they are more likely to rate themselves lower on measures of sociability, well-being, and confidence (Silver, Westbrook, & Stein, 1998; Taylor, Klein, Minich, & Hack, 2001), and may report impaired relationships with their child, partner, and other family members (O'Brien, Asay, & McCluskey-Fawcett, 1999). Stresses experienced by parents of premature children as a result of their child's medical needs may deplete a family's emotional reserves and ability to cope with various life stressors which may result in impaired interactions between parents and premature children (Feldman, Weller, Leckman, Kuint, & Eidelman, 1999).

Parents of premature children often report higher level of stress when compared to parents of full-term infants (Cronin et al., 1995; Davis, Edwards, Mohay, & Wollin, 2003).

Parents of premature children with shorter gestational ages, lower birthweights, more severe medical conditions, and increased health care needs after hospital discharge are more likely to report increased levels of stress (Drotar et al., 2006; Kuster & Merkle, 2004; Singer, Davillier, Bruening, Hawkins, & Yamashita, 1996). Mothers are also more likely to report experiencing significantly higher rates of distress than fathers (Tommiska, Ostberg, & Fellman, 2002). In addition to the stresses that result from their child's premature birth, families living in disadvantaged social environments (e.g., low socioeconomic status, family stressors, lack of family support or resources) report heightened levels of stress in comparison to families who do not experience as many environmental stressors (Bendersky & Lewis, 1994; Taylor, Klein, Schatschneider, & Hack, 1998).

Mixed findings have been reported with regard to the length of time in which stress levels remain elevated for parents of premature children. A number of studies have found that mothers of premature children may experience heightened levels of stress up to 5 years after their child's birth (Cronin et al., 1995). Other investigations have found stress levels to be greatest in the first year following a child's premature birth, after which time levels of stress decrease to be comparable to parents of full-term children after one year (Majnemer et al., 2007; Stjernquist, 1996). As a premature infant develops beyond the newborn period, parental stress may persist as the child grows and may even increase as greater demands are placed on the child's cognitive skills and independent functioning (Beckman & Pokorni, 1988; O'Callaghan et al., 1996). Parenting stress may also increase as the child approaches school-age and parents realize that their child has greater concerns than they initially thought or that they are having increased difficulty keeping up with their peers.

Lee, Penner, and Cox (1991) surveyed parents of VLBW preschool children with cognitive delays, normally developing VLBW children, and healthy children born full-term. Parents of VLBW children with cognitive delays reported no greater personal, family, or financial strains than parents of full-term children when their children entered preschool. At this time, parents of normally developing VLBW children even reported less negative personal and family impact than a comparison group of parents of healthy term children. This study demonstrates that parents may become accustomed to the needs of their premature child over time so that the stresses experienced by parents during the neonatal period reduce their impact on parent functioning as a premature child ages.

Few controlled studies have investigated the impact of premature birth on parenting stress beyond the neonatal period. To better understand the experience of parents of premature children over time, Singer et al. (1999) conducted a longitudinal study examining the impact of premature birth on parenting stress and family functioning at multiple age points for high- and low-risk VLBW infants and full-term controls. High-risk VLBW infants were defined as those with: a diagnosis of bronchopulmonary dysplasia, birthweight less than 1500g, required oxygen support for more than 28 days, and radiographic evidence of chronic lung disease. Low-risk infants did not have a diagnosis of bronchopulmonary dysplasia, were preterm, weighed less than 1500g at birth, and required oxygen support for less than 14 days. Mothers completed self-report measures assessing the presence of psychological distress (e.g., obsessive-compulsive behavior, depression, anxiety, hostility, etc.), parenting stress, family impact, and if the family experienced other life stressors (e.g., moving, loss of employment) at 1, 8, 12 months, and 2 and 3 years corrected age.

Mothers of high- and low-risk VLBW infants reported increased levels of distress at 1 month, but reported stress levels comparable to mothers of full-term infants at 8 and 12 months. During the first month of the child's life, mothers of high- and low-risk VLBW infants reported increased symptoms of depression, anxiety, obsessive-compulsive disorder, and difficulty concentrating and making decisions. Mothers of high-risk VLBW infants reported more symptoms of distress at 2 years, more negative family impact at 2 and 3 years, and more parenting strains and illness stressors at 3 years. By 3 years, mothers of high-risk infants reported parenting stress levels comparable to mothers of full-term infants along with similar levels of parenting satisfaction. At 3 years, mothers of high-risk infants viewed their child as more demanding than full-term children. These results suggest that mothers of high-risk premature infants experience some psychological adaptation over time in response to the needs of their child and family. Further study is needed to determine whether specific behavioral or cognitive processes assist mothers in adapting to the needs of their premature child.

#### *Parenting Stress and Behaviors*

Parenting stress has been subject to vigorous research in terms of its affect on parenting behaviors and child development. Parent-child interactions are often a focal point for the manifestation of the effects of a variety of sources of parenting stress and dysfunctional parent-child interactions are frequently included in the measurement of parenting stress (Abidin, 1995; Mash & Johnston, 1990). Parents who report greater levels of parenting stress have been found to engage in more authoritarian parenting styles, control-oriented behaviors, may be less involved with their child, and may exhibit a lack of positive and mutually responsive interactions in comparison to parents who report lower levels of parenting stress (Belsky, Woodworth, Crnic, 1996; Deater-Deckard & Scarr, 1996; Fox & Gelfand, 1994). Parents are also more likely to

perceive their child as distractible, hyperactive, demanding, and less acceptable when compared to mothers of full-term and low-risk premature children (Singer et al., 1999; 2007). Parenting stress has also been associated with negative outcomes for children including insecure attachment, behavior problems, and impaired emotional and mental well-being (Crnic & Low, 2002; McCormick, Workman-Daniels, & Brooks-Gunn, 1996). Miller, Bowen, Gibson, Hand, and Ungerer (2001) found a significant association between family stress and behavior difficulties at 8 years of age among VLBW children. The earlier negative interactions begin between parents and children, and the longer the disruption lasts, the worse the outcomes for children and families (American Academy of Pediatrics, 2003).

To better understand the complex relations between maternal stress, prematurity, and parenting behaviors, it is important to include mothers with varying levels of emotional stress. The associations among maternal stress, prematurity, and parenting behaviors were explored in a sample of one hundred and eighty premature and 112 full-term children and their mothers (Assel et al., 2002). At a 3-year home visit, mothers completed questionnaires regarding their current emotional distress level. Mothers were observed during a 60-minute period engaging in daily activities and during a 10-minute play session using developmentally appropriate toys with their child. Mothers then rated their child's behavior using a behavior checklist at a 4-year home visit and children's social initiating skills were observed across a 70-minute period consisting of activities similar to the observation period that was used during the 3-year home visit to obtain information on parenting behaviors. Parent ratings of child attention and social problem scores were within the average range, though parents of premature children were more likely to report moderate levels of behavior problems. Mothers with higher levels of emotional stress displayed less warmth and flexibility during interactions with their child and children also displayed fewer



bids for adult attention. Mothers who experience increased amounts of parenting stress may therefore have difficulty responding sensitively to their children's needs and interests which may cause children to learn that their attempts to gain their parent's attention are not positively met. Premature children may therefore exhibit decreased social initiations over time. Mothers in this study who reported mild to moderate levels of emotional distress were more likely to rate their children as having more social and attention problems than mothers with reduced stress levels. These findings suggest that increased symptoms of stress may undermine the display of positive parenting behaviors. Heightened levels of stress may also blemish a parent's view of their child and contribute a parent's perception that their child exhibits more difficult behaviors than may actually be present. Thus, increased levels of parenting stress may erode the emerging parent-child relationship and result in negative outcomes for premature children.

Muller-Nix et al. (2004) examined the impact of maternal stress due to premature birth on the quality of mother-child interactions among children born premature and full-term controls. Mothers completed the Perinatal Risk Inventory (PERI; Scheiner & Sexton, 1991) to describe the severity of the infant's perinatal problems and the Perinatal Posttraumatic Stress Disorder Questionnaire (PPQ; Quinnell & Hynan, 1999) to assess maternal stress during the perinatal period. When premature infants were 6 and 18 months corrected age, mothers engaged in a 10-minute videotaped interaction during which parent and child behaviors were coded using the Care Index (Crittenden, 1988). Results showed that maternal behavior varied when mothers were interacting with premature versus full-term infants at 6 months in relation to PERI and PPQ scores. Mothers of high-risk infants as well as mothers that reported greater scores on the PPQ during the perinatal period were less sensitive and displayed more controlling behaviors than full-term mothers during interactions with their children at 6 months corrected age. No

differences were found between preterm and full-term dyads at 18 months corrected age.

Findings demonstrate that scores obtained from the PERI did not predict maternal stress levels at 18 months corrected age. Such findings support the importance of examining maternal stress related to premature birth and its potential long-term influence on interactions between a mother and premature child.

Such findings demonstrate that stress plays an important role in the lives of parents of children born premature. However, many of these findings are hampered by methodological limitations that may be improved upon in future investigations. First, few studies have compared mothers of preterm children to mothers of children born full-term. While mothers of children born full-term may provide a normative reference for the stresses experienced by a majority of mothers after the birth of a child, mothers of premature children have dramatically different birth experiences than mothers of children born full-term and therefore it is not surprising that mothers of premature children report higher levels of parenting stress when compared to this group. Research investigating the psychosocial stresses of parents of premature children should be conducted among similar groups of parents of premature children to obtain a better understanding for the needs of parents of premature children.

Second, research investigating the impact of premature birth on parenting stress has frequently been conducted while the infant is still in the neonatal intensive care unit (NICU) or within the first few months of their birth. It has been suggested that it may take as long as two years for a family to recover from the NICU experience and to return to the previous level of adjustment or stability that was perceived to be present prior to the birth of a premature child (Laadt, Woodward, & Papile, 2007). To gain a more accurate assessment of the parenting stresses associated with raising a premature child, an extended period of time between when a

child is brought home from the hospital and when psychological measures are administered is needed to understand the experiences of parents of children born premature.

Third, studies have also frequently compared the stresses experienced by mothers of premature children diagnosed with specific medical conditions to mothers of children without such conditions. For example, psychological distress experienced by mothers of premature children with VLBW and ELBW (Elklit, Hartvig, & Christiansen, 2007; Maccow et al., 2006), bronchopulmonary dysplasia (Singer, et al., 1996), and chronic lung disease (Singer et al., 1999) have been examined in comparison to mothers of children without such conditions. Studies that simply focus on a child's birth status (i.e., birthweight and/or gestational age) or specific medical factors or diagnoses in isolation do not account for the constellation of medical needs and environmental influences that premature children frequently experience. The needs of moderately premature children may also be overlooked because it may be assumed that these children experience a reduced number of medical complications related to their premature birth (Amiel-Tison et al., 2002). Few studies have examined the relationship between cumulative medical risk factors and cumulative psychosocial risk factors on maternal reports of parenting stress among parents of premature children (Candelaria, O'Connell, & Teti, 2006). Such investigations are necessary for intervention efforts to meet the multifaceted needs of premature children and their families.

Heightened stress levels threaten parent's beliefs that they are able to engender positive outcomes for their child in addition to weakening their ability to display quality behaviors that can promote child development. Abidin (1990) has suggested that research on parenting stress extend beyond focusing on main effect models to an expanded focus on parental cognitions and perceptions that may affect parenting stress. In the time since this recommendation was made,

researchers have yet to examine parent self-efficacy beliefs in relation to the behaviors exhibited by parents of premature children. By examining the various pathways in which parenting stress and self-efficacy beliefs contribute to outcomes for premature children, interventions may be implemented to reduce the negative effects of psychosocial risk factors to improve the behaviors of parents and enhance child functioning.

### *Parental Self-Efficacy*

Self-efficacy is defined as a set of beliefs that one holds with regard to their ability to successfully produce a desired outcome (Bandura, 1997). To feel efficacious, one must believe that they possess the beliefs, capabilities, and actions to be successful (de Montigny & Lacharite, 2005). Parenting self-efficacy is defined as the beliefs or judgments a parent holds of their capabilities to organize and execute a set of tasks related to positively influencing the behavior and development of their child (Coleman & Karraker, 2000). To possess a high sense of parental self-efficacy, parents must believe they have an understanding of age-appropriate child care behaviors, confidence in their ability to perform such behaviors, the belief that their child will respond to their actions, and the belief that friends and family will be supportive in their efforts to parent effectively (Coleman & Karraker, 1997).

Parental self-efficacy has rarely been investigated among pediatric populations, particularly among children born premature. When parent self-efficacy has been investigated among children with pediatric conditions, investigations have typically focused on a parent's ability to control or manage aspects of their child's symptoms or medical condition (Bursch, Schwankovsky, Gilbert, & Zeiger, 1999; Hanson, 1998) or their ability to adapt to their child's diagnosis (Barlow, Shaw, & Wright, 2000). In studies examining parental self-efficacy among parents of premature children, parents frequently, yet inconsistently, report reduced feelings of

efficacy when compared to parents of full-term children. Olshtain-Mann and Auslander (2008) compared ratings of parental stress and competence among mothers and fathers of preterm infants with those of parents of full-term infants two months after discharge from the NICU. Results showed that two months after hospital discharge, mothers of preterm infants showed significantly higher levels of parental stress and significantly lower levels of parental competence than mothers of full-term infants. Fathers of premature children showed significantly higher levels of parental stress in comparison with fathers of full-term children, though no significant differences were found for parental competence between fathers of premature and full-term infants.

Parents may experience feelings of guilt, failure, and inadequacy following a preterm birth which may reduce their sense of self-efficacy (May, 1997). Mothers of children with a greater number of medical risk factors (e.g., lower gestational age, birthweight, APGAR scores, and more days spent in the hospital), developmental risk factors, and medical complications reported lower self-efficacy than mothers of full-term infants (Gross et al., 1989; McGrath, Boukydis, & Lester, 1993). Parents of children born premature may also rate themselves low on measures assessing their level self-efficacy as they may perceive their child's health, temperament, or developmental needs as obstacles that are beyond their control and may feel that medical professionals are more capable of meeting their child's needs than themselves (Cutrona & Troutman, 1986; Scheel & Rieckmann, 1998; Teti & Gelfand, 1991).

Parents of premature children may report positive self-efficacy beliefs as a result of how they view their child's health needs and the caregiving opportunities that their child's health condition has provided them. Parenting a premature child with health care needs may provide parents with increased opportunities to successfully deal with challenges related to caring for

their child and managing multiple role demands (Hastings, Allen, McDermott, & Still, 2002). In possessing positive perceptions of their child's health condition, parents may view their child as a source of strength, happiness, fulfillment, and as a means by which their family has been brought closer together (Saigal, Burrows, Stoskopf, Rosenbaum, & Streiner, 2000). Positive perceptions of self-efficacy may indicate positive adaptation in family members of high-risk children and a mechanism for coping with the stressors of caring for a child with medical needs. It may also be that mothers deny negative feelings toward their child as a result of social desirability bias (Harrison, 2001). Additional investigation is needed with regard to how self-efficacy in particular may assist parents in meeting child caregiving needs.

#### *Parental Self-Efficacy and Parenting Stress*

Parental self-efficacy has been shown to impact the psychological functioning of parents in a number of ways. Jones and Prinz (2005) conducted a review examining the potential roles of parental self-efficacy in parent and child adjustment and the role of parental cognitions in understanding behaviors and emotions of families. This review confirmed that parent self-efficacy was positively related to one's ability to manage multiple role demands (Erdwinds, Buffardi, Casper, & O'Brien, 2001) and use active coping strategies (Dumka et al., 1996). Women with high levels of stress reported lower parent self-efficacy and rated their children as less competent than non-stressed mothers (Fox & Gelfand, 1994). Parent self-efficacy has also been negatively correlated with parenting stress among preschool children, (Scheel & Rieckmann, 1998). Though Scheel and Rieckmann (1998) found parenting stress alone to be a significant predictor of parenting self-efficacy, it may also be the case that a transactional relationship exists between parenting stress and parenting self-efficacy. Though parenting self-efficacy has been shown to be strongly correlated with parenting stress (Erdwins et al., 2001;

Gross, Fogg, & Tucker, 1995), the direction of this relationship is unclear and in need of additional study.

In a sample of low-income mothers, Raikes and Thompson (2005) examined the relationship between social support, self-efficacy, and parenting stress. Participants included 65 mothers of children enrolled in an Early Head Start program. Parenting stress was assessed with the Parenting Stress Index – Short Form Parenting Distress subscale (Abidin, 1995), the Pearlin Mastery Scale (Pearlin & Schooler, 1978) was used to measure self-efficacy, the Dunst Family Resource Scale (Dunst & Leet, 1987) was used to measure the adequacy of family resources in the home. Information describing family risk factors (e.g., educational level, presence of health or emotional problems, divorce within the past year) and family income was also collected. Results indicated that a significant proportion of variance in parenting stress was explained by self-efficacy, family risk, and the interaction of self-efficacy and family income. Social support was not associated with lower parenting stress levels, though social support did moderate the effect of income on parenting stress. These results indicate that parent self-efficacy predicts parenting stress levels and that mothers with higher parenting self-efficacy report lower levels of stress. Self-efficacy also moderates the relationship between parenting stress and family income and when combined, the interaction between family risk and parent self-efficacy predict stress levels.

Maternal self-efficacy and social support may buffer the extent to which difficult child behaviors and parenting stress affect parenting practices. The relationship among maternal self-efficacy, child behaviors, social support, and parenting practices was examined among a group of 188 single, African-American mothers of preschool children (Jackson, 2000). Mothers completed scales assessing perceived self-efficacy (Pearlin & Schooler, 1978), quality of social

support from family and friends (Procidano & Heller, 1983), parenting stress (Abidin, 1990), level of involved and supportive parenting (Caldwell & Bradley, 1984), and perception of child behavior problems. Multiple regression analyses found that child behavior problems explained a significant proportion of the variance in parenting stress. Analyses also revealed that the relationship between parenting stress, parenting behavior, child behavior problems, and mothers' parenting behavior were moderated by self-efficacy and social support from family and friends. Results show that although behavior problems may affect parenting behaviors, the effect of this relationship is somewhat reduced among women with higher self-efficacy. Self-efficacy may therefore buffer the effect of child behavior problems on parenting behaviors and may determine the amount of parenting stress an individual may experience and how their behaviors may be affected as a result.

Silver, Bauman, and Ireys (1995) examined the impact of child illness related functional limitations, maternal self-esteem, and self-efficacy to maternal symptoms of psychological distress. Participants included 365 urban mothers of 5- to 9-year-old children with diverse chronic illnesses. The presence of child functional limitations and lower reports of self-esteem and self-efficacy was associated with higher maternal psychological symptoms. Self-esteem had a negative relationship with psychological distress, though a significant interaction was found between self-efficacy and a child's functional status indicating that mothers experienced greater distress when their children had illness-related functional limitations and maternal efficacy was low. Mothers who had high feelings of parent self-efficacy reported lower levels of stress, whereas mothers with low levels of self-efficacy reported higher levels of stress in relation to providing effective care for their child. Maternal self-efficacy was therefore found to moderate the relationship between child functional limitations and maternal stress.



Overall, studies suggest that parent self-efficacy may reduce the negative effects of parenting stress among parents in low-income environments and of children with health limitations. Relatively few studies have examined the impact of parent self-efficacy on parent psychological factors (Jones & Prinz, 2005) and studies have yet to replicate the findings presented here among parents of premature children. Parental self-efficacy may serve as a protective factor for parents of premature children experiencing increased levels of stress as increased feelings of self-efficacy have been associated with a number of positive parenting attitudes and behaviors. Increased feelings of self-efficacy may therefore have important implications for the behaviors exhibited by parents of children born premature.

#### *Parental Self-Efficacy and Parenting Behaviors*

Parent self-efficacy is an important variable for understanding the behaviors exhibited by parents during interactions with typically developing children. High maternal self-efficacy predicts the use of adaptive parenting practices, such as maternal warmth and sensitivity (Teti & Gelfand, 1991), responsiveness (Stifter & Bono, 1998), greater attention to infant signals (Coleman & Karraker, 1997), engaging in non-punitive and responsive behaviors, creating a stimulating child-rearing environment (Donovan et al., 1990; Unger & Waudersman, 1985), providing more direct and active parenting interactions (Mash & Johnston, 1983), and using positive coping skills (Wells-Parker, et al., 1990). Parents with high self-efficacy are also more likely to approach difficult tasks in a calm manner when compared to individuals with low self-efficacy who may believe that tasks are more difficult than they may initially appear (Pajares, 2002). These parental characteristics protect against the development of child and adolescent behavior problems (Pettit & Bates, 1989; Lamborn, Mounts, Steinberg, & Dornbusch, 1991), promote higher child self-esteem, school performance and social competence, and lower levels

of anxiety and depression (Holmbeck, Paikoff, & Brooks-Gunn, 1995; Patterson, DeBaryshe, & Ramsey, 1989). Low maternal self-efficacy is associated with maternal learned helplessness (Donovan et al., 1990) and the display of defensive and controlling behaviors with children (Donovan et al., 1990). Bandura (1991) reported that people who are low in self-efficacy tend to engage in negative self-thoughts in difficult situations, which undermines their ability to attend to tasks and solve problems effectively. Because parenting can be challenging and requires attention and problem-solving skills, feelings of low self-efficacy and negative self-cognitions can potentially undermine the quality of parenting.

Although self-efficacy has been identified as a predictor of parenting behaviors, the process by which self-efficacy influences specific domains of parenting, such as sensitivity, is unclear. The impact of maternal self-efficacy on maternal sensitivity during situations in which an infant was distressed was examined in a sample of 92 first-time mothers with 6-month-old infants (Leerkes & Crockenberg, 2002). Mothers completed measures assessing their sense of self-esteem, self-efficacy, and perceptions of their infant's temperament. Maternal behavior was observed during a laboratory assessment of four activities designed to distress the infant to assess infant temperament and reactivity. Multiple regression analyses were used to examine the main effects of maternal self-efficacy on maternal sensitivity. Maternal self-efficacy interacted with infant distress to predict maternal sensitivity during distressing infant activities. Infant distress was negatively associated with sensitivity when maternal self-efficacy was low. When maternal self-efficacy increased, infant distress was positively associated with the display of sensitive behaviors. Mothers had the highest self-efficacy when their infants were both easily distressed and highly soothable, which indicates that mothers experience positive reinforcement contingencies when they are able to soothe their infants. Findings suggest that maternal self-

efficacy moderated the impact of infant distress on maternal sensitivity during difficult tasks and that maternal characteristics alter the association between infant temperament and maternal behavior.

Donovan, Taylor, and Leavitt (2007) conducted a study to determine whether the relationship between mothers' perceptions of self-efficacy and responsiveness to infant behaviors was moderated by knowledge of infant development. Mothers engaged in a feeding task with their 9-month old infants. Self-efficacy was measured by assessing illusory control during a laboratory task. Illusory control refers to perceived control over uncontrollable events and is considered to be an adaptive coping strategy of a healthy individual (Alloy & Abramson, 1979). High illusory control reflects low self-efficacy, moderate illusory control reflects high self-efficacy, and low illusory control reflects an intermediate level of self-efficacy. Analyses indicated that mothers with moderate illusory control had greater behavioral sensitivity and showed a more positive affect during interactions with their infants. Thus, maternal self-efficacy may be a predictor of sensitive and responsive maternal behavior during interactions with infants.

The degree to which infant and maternal characteristics were related to maternal psychological distress and play competence in premature and full-term mother-infant dyads during the postpartum period was examined in sample of 40 preterm and 40 full-term mother-infant dyads (Halpern & McLean, 1997). Measures of maternal psychological distress, self-efficacy, infant temperament, and mother-infant interaction in a play situation were obtained at 4 months corrected age. Using a series of hierarchical multiple regressions, findings revealed that maternal self-efficacy was the strongest correlate of maternal psychological distress but was not related to maternal play competence. A relationship was found between self-efficacy and

psychological distress among mothers of premature infants, but not among mothers of infants born at term. The authors suggest that quality caregiving skills may be seen as more critical in caring for a biologically vulnerable infant, which may explain why caregiving competence had a significant impact upon the distress level of mothers of infants born prematurely and not children born full-term. Mothers of older premature infants reported increased psychological distress and lower self-efficacy. It is possible that these children were behaviorally challenging as infants and prolonged contact with these infants had a negative impact on mothers' psychological well-being. Self-efficacy may impact the mother-infant dyad as additional time passes and mother and child have more frequent, negative interactions with one another. Investigating the extent to which maternal self-efficacy impacts the quality of dyadic interactions with infant maturation requires further study.

Results from the studies presented suggest that maternal self-efficacy may reduce the effects of challenging infant characteristics and predict the display of sensitive and responsive parental behaviors during interactions with young children. However, the specific mechanisms by which parent self-efficacy affects the functioning of parents of premature children remains unclear. To buffer the amount of stress experienced by parents of premature infants, an increased sense of self-efficacy may be needed. Though parent self-efficacy has yet to be explored in relation to child medical risk and parent behaviors, it is expected that high levels of parenting self-efficacy will contribute to the more frequent display of positive behaviors during interactions with premature children. Thus, the purpose of this study was to determine if parental self-efficacy would serve as a protective factor against the adverse effects of child medical risk and parenting stress on parenting behaviors and the home environment for parents of premature children. Increased understanding with regard to the role of parent self-efficacy

among diverse parent and child populations will help to identify essential targets of intervention to reduce the negative effects of medical and psychological risk and to increase the display of positive parenting behaviors.

The following section describes behaviors exhibited by parents and premature children during interactions with one another. Parental responsiveness and acceptance, constructive behaviors, support for learning, and support for autonomy are reviewed as these parenting behavior domains have been shown to be predictive of positive parent-child relationships, child well-being, and child academic, behavioral, socioemotional development. The current literature base related to these domains is discussed in the following section along with implications for parent and child well-being.

### *Parenting Behaviors*

Parents have an enormous amount of influence over their child's lives and interactions between parents and children are viewed as the main effective ingredient for optimal social, emotional, behavioral, and cognitive development in young children (Kelly, Morisset, Barnard, Hammond, & Booth, 1996). In a positive relationship, both partners experience a sense of competence, self-worth, and a desire for more relationships (National Scientific Council on the Developing Child, 2004). Early interactions between parents and children provide the foundation for future relationships of the child with siblings and peers (O'Brien & Dale, 1994), as well as for the development of self-confidence, security, emotional stability, and social competence (Talmi & Harmon, 2003). Enriching parent-child relationships have significant implications for both the parent and the child and as a result, it is important to examine the conditions by which parents may be more likely to engage in healthy, supportive interactions with their children to promote positive development.

### *Parenting Behaviors with Premature Children*

Parents of premature children face unique problems caused by the timing of a child's birth, a prolonged hospital stay, and distinctive patterns of behavior and development in a premature child's early years. When a child is born premature, medical or physical complications may require hospitalization in the NICU for days, weeks, or even months. Parents may feel helpless while their child is in the NICU and may not know, or have the opportunity to interact with their child during their time in the hospital. This separation may result in missed opportunities for parents and children to bond and interact and may hinder the development of early parent-child relationships. Parents may then have misconceptions about their infant and may have difficulty interacting with them in a sensitive manner. Negative parent-child interactions that begin early in the child's life may contribute to a negative trajectory of parent outcomes including anxiety, depression, and continued negative parent-child interactions (Miles, Holditch-Davis, Burchinal, & Nelson, 1999).

Interactions among parents and premature children have been extensively studied during the infancy years as this is a time when premature children are most different from their peers and more challenging social partners (Beckwith, 1990; Goldberg & DiVitto, 2002). During this time, premature children may exhibit behaviors described as irritable (Eckerman, Hsu, Molitor, Leung, & Goldstein, 1999), less attentive (Malatesta, Grigoyev, Lamb, Albin, & Culver, 1986), and may be difficult to calm or engage socially (Bozette, 2007; Talmi & Harmon, 2003). Premature infants may also exhibit fewer social smiles (Segal et al., 1995), be difficult to soothe (Friedman, Jacobs, & Werthman, 1982), may not provide clear behavioral cues (Eckerman et al., 1999), and show lower levels of alertness, expression, emotional self-regulation, and tolerance for tactile and sensory input (Maccow et al., 2006). Premature infants with more medical

complications have been shown to exhibit greater difficulties interacting with their parents than healthier peers (DiVitto & Goldberg, 1979). Studies have also suggested that prematurity does not place children at-risk for interaction difficulties, but the specific medical risk factors (e.g., respiratory distress, IVH) associated with a preterm birth may be more related to the quality of the parent-child relationship (Cox, Hopkins, & Hans, 2000). It is unknown what specific medical risk factors, or what combination of risk factors, associated with prematurity may place an infant at risk for a poor relationship with their parent.

Parents of children born premature have been shown to exhibit behaviors that may impair their relationship with their child. Parents of premature children have been shown to exhibit behaviors described as developmentally inappropriate (Schmucker et al., 2005), directive (Moore et al., 1998), controlling (Forcada-Guex et al., 2006), intrusive or insensitive (Zarling, Hirsch, & Landry, 1988), negative (Mash & Johnston 1990), unresponsive to child cues (Harrison & Magill-Evans, 1996), and may be less actively involved with their child in the form of moving their child, providing body contact, and vocalizations than parents of full-term controls (DiVitto & Goldberg, 1979; Holditch-Davis & Thoman, 1988). Interaction difficulties may decrease as premature children age (DiVitto & Goldberg, 1983) while some interaction problems have been shown to persist through the preschool years (Donohue & Pearl, 1995) and into early adolescence (Beckwith, Rodning, & Cohen, 1992).

Descriptions of the behaviors of mothers of premature children during typical interactions have been inconsistent (Halpern & McLean, 1997). While parents may exhibit a number of negative behaviors during interactions with premature children, some studies have shown that infants who experienced more neonatal complications received *more* caregiving from their mothers at 1 month corrected age (Beckwith & Cohen, 1978). Investigations conducted with

infants past 3 months corrected age show that mothers may work harder to hold, touch, and provide kinesthetic stimulation to their child (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983). Mothers of preterm infants may also be more active in initiating and maintaining interactions and provide increased amounts of stimulation throughout the first year (Crnic et al., 1983; Field, 1979). Heightened levels of behavior may reflect parental efforts to compensate for their child's behavior and adapt to the needs of their child (Goldberg & DiVitto, 1995; Miles & Holditch-Davis, 1995). Parents who attempt to engage a premature child in interactions may overwhelm the infant's capacity for social interaction resulting in infant distress, thus creating a negative feedback loop where both the infant and parent engage in noncontingent and non-rewarding behaviors (Browne & Talmi, 2005). Patterns such as these may lead to feelings of helplessness and despair resulting in impaired parent-child interactions.

The parent-child relationship is influenced by a number of factors present within the child, their caregiver, and their larger environment. Though premature children may possess a number of characteristics that make it difficult for supportive relationships to emerge with their parents early in their life, parents have the unique opportunity to facilitate the attainment of a positive relationship with their child by exhibiting behaviors to promote child growth and development. Parents who are described as being sensitive, aware of their child's behavioral cues, available to the infant both physically and psychologically, cognizant of organized and disorganized infant behaviors, and reactive to their child's needs promote the obtainment of a constructive parent-child relationship, healthy child development, and positive mental health gains for themselves and their child (Browne, MacLeod, & Smith-Sharp, 1996). The development of optimal parent-child relationships may be characterized by parental



responsiveness and acceptance, constructive behaviors, support for learning, and support for autonomy. The following sections will provide more information on these important constructs.

### *Parental Responsivity and Acceptance*

Sensitive or responsive parenting behaviors include behaviors that are prompt and contingent on infant communication signals and encourage joint engagement and reciprocity in dyadic interactions (Bakeman & Adamson, 1984; Trevarthen, 1988). Parental acceptance includes behaviors that provide emotional support, availability, and warmth (Landry, Smith, & Swank, 2006). Behaviors that provide warmth and sensitivity include the presence of affective input (e.g., smiling), the absence of highly negative behaviors (e.g., harsh voice tone, physical intrusiveness), and the display of a parent's interest and acceptance toward their child (Darling & Steinberg, 1993).

Parents who respond to their child in a warm and responsive manner provide a strong foundation for their child's future development (Ainsworth, Blehar, Waters, & Wall, 1978). Maternal responsiveness has been shown to be highly predictive of optimal socio-emotional development, communication, and cognitive development among young children (Bornstein & Tamis-leMonda, 1989; Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; Landry et al., 2006). Sensitive and responsive parenting has also been shown to facilitate children's understanding of cause and effect relationships (Parpal & Maccoby, 1985; Rocissano, Slade, & Lynch, 1987) and to predict secure attachments with adults (Guralnick, 2006; NICHD Early Child Care Research Network, 2002).

Warm and sensitive or responsive care from a child's parent has been investigated extensively among children born premature. Poehlmann and Fiese (2001) tested a model in which parent-child interaction quality is a potential mechanism through which the combined

affect of neonatal health and sociodemographic risk factors predict cognitive development in VLBW, LBW, and full-term infants. Neonatal and maternal risk indices were created based on previous work with premature children. One point was given for the presence of a variety of neonatal health and demographic risk factors (e.g., birthweight under 2500g, hospitalization for more than one week, experiencing apnea, less than high school education, single parent, etc.). Quality of parent-infant interaction was observed using the Pediatric Infant Parent Exam (PIPE; Fiese et al., 2001) which was scored for degree of interactional reciprocity and positive affect at the beginning, middle, and end of an interactional game that the infant enjoyed, such as peek-a-boo. The Mental Scale (MDI) of the Bayley Scales of Infant Development (Bayley, 1969) was used to assess infant cognitive skills at 12 months. Results indicated that quality of infant-mother interactions at 6 months mediated the relation between neonatal risk and infant cognitive development at 12 months. Parent behaviors characterized as responsive, positive, and engaged significantly predicted higher Bayley MDI scores. Although infants who experienced more neonatal health risks were more likely to exhibit problematic interactions with their mothers at 6 months and obtain lower cognitive scores at 12 months, the relation between neonatal risk and cognitive development was not direct and quality of parent-infant interaction mediated the relation between neonatal risk and cognitive development. Therefore, despite a premature child's level of medical risk, infants who experienced early positive interactions were more likely to experience improved cognitive skills at 12 months. Consequently, engaging in adaptive interactions with their parents may contribute to cognitive resilience in high-risk infants.

The role of early versus ongoing maternal responsiveness was investigated with regard to predicting cognitive and social development in medically high- and low-risk premature children and full-term controls. Landry, Smith, Swank, Assel, and Vellet (2001) sought to determine if

optimal parental behaviors were consistently displayed across infancy and early childhood to promote optimal developmental outcomes for this population. Maternal behaviors and children's social responsiveness, cognitive skills, and language skills were assessed at 6, 12, and 24 months, and 3 ½ and 4 ½ years of age. Consistency in responsiveness was found to help children sustain a positive developmental trajectory for cognitive and social skills. If responsivity was only provided during infancy and then withdrawn during preschool ages, results from this study indicate that children may not sustain adequate levels and rates of growth. Results also indicate that preterm children benefited more than full-term children from the display of consistent responsive behaviors to foster their development. The consistent display of responsive parenting behaviors therefore has important implications across infancy and early childhood for children regardless of medical risk.

The use of harsh and controlling parenting practices has also been shown to be related to child outcomes. Reliance on restrictions that limit or prevent children from engaging in an activity of interest increases children's defiance and noncompliance (Hart, DeWolf, Wozniak, & Burts, 1992; Power & Chapieski, 1986) and may negatively influence a child's social development as a child grows and tries to assert more independence over their environment (Landry, Smith, Swank, & Miller-Loncar, 2000). As children learn to take more initiative, their parents may need to decrease the amount of direction they provide. Greater decreases in maternal directiveness may be necessary for premature children as these children may need more opportunities to take an active role in increasing their social skills (Landry et al., 1998). Parental behaviors that are sensitive to a child's interests and contain an appropriate amount of demands and directives are more likely to result in faster rates of cognitive, language, and social development for medically high-risk children (Landry, Smith, Miller-Loncar, & Swank, 1997).

Moore et al. (1998) investigated the relationship between parents' responsiveness and directiveness and children's developmental outcomes at 5 ½ years old. Participants included 88 children who experienced neonatal IVH and other medical complications. Eighty-two of these children were born prematurely with VLBW and all participants had been patients in a NICU. Child medical complications were assessed using the Medical Problem Index (MPI) developed by the authors. Using this scale, 1 point was assigned for the presence of each of the following medical problems: bronchopulmonary dysplasia, respiratory distress, retinopathy of prematurity, apnea, and seizure. Information describing the child's developmental functioning was completed through child administration and parent interview using the Battelle Developmental Inventory (BDI; Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984). General intellectual ability was measured using the Stanford-Binet Scale of Intelligence – IV (Roid, 2003). At 2 years of age, children were videotaped engaging in free play activities with their caregiver. The Parent/Caregiver Involvement Scale (P/CIS; Farran, Kasari, Comfort, & Jay 1986) and the Maternal Behavior Rating Scale (MBRS; Mahoney, 1992) were used to code parent behaviors. Subscales representing amount, quality, and appropriateness of responsive and directive parental behaviors were used from the P/CIS and the directiveness and responsiveness subscales from the MBRS were used in this study.

Findings demonstrated that all measures of directiveness and responsiveness were significant predictors of developmental outcomes at 5 ½ years. Quality of directiveness and appropriateness of directiveness and responsiveness on the P/CIS and MBRS produced positive significant correlations with intelligence measures. In early interactions, directiveness and responsiveness that were superior in quality and appropriateness predicted higher intelligence scores. More directiveness in early years predicted lower intelligence scores at school age.

Results also showed that every measure of responsiveness was negatively correlated with measures of the amount of directiveness. This finding indicates that parents who were more responsive to their child's behavior showed lower incidences of directiveness during interactions with their child. Findings therefore suggest that the critical aspects of directiveness may lie in the appropriateness of the directives and the manner in which the directives are given to an individual child. To optimize developmental outcomes, directiveness needs to be accompanied by maternal sensitivity to the child.

Halpern et al., (2001) examined the moderating affects of parenting child-rearing attitudes on the relationship between parenting stress and infant behavior characteristics for mothers of VLBW infants and full-term controls. Participants included fifty-six 9-month old VLBW infants, thirty-three normal birthweight full-term children, and their mothers. Mothers completed measures assessing infant behavior characteristics, parenting stress levels, and parenting attitudes. Infant behavior characteristics used in this study included (a) distress to limitations, (b) fear, (c) soothability, and (d) smiling and laughter. Parenting attitudes included (a) warmth, (b) encouragement of independence, (c) strictness, and (d) aggravation. Correlational analyses showed that mothers of VLBW infants who perceived a greater number of their infant's behaviors as problematic reported using a stricter child-rearing approach and experienced greater parental aggravation. Mothers who described their infants as more angry reported increased parental aggravation.

Multiple regression analyses were also conducted and showed that the relation between parenting stress and infant temperament was moderated by mothers' child-rearing attitude but was significant only within the VLBW group. For mothers with VLBW infants, increased infant distress was associated with greater parenting stress when mother's strictness was at medium or

high levels but not low levels. When mothers who hold a stricter child-rearing approach are paired with an infant who becomes frequently distressed, they are more likely to experience greater parenting stress. High levels of infant distress did not appear to adversely affect mothers' parenting experiences, so long as the mothers hold a less strict child-rearing attitude. Because mothers of VLBW infants are exposed to highly stressful events related to their child's birth/health and survival, they may become more attentive to their infants behavioral displays than mothers of full-term infants. This heightened vigilance may promote a greater sensitivity to the infant's behavioral characteristics as well as to their own parenting attitudes, thus affecting mothers' parenting experiences

### *Constructive Behaviors*

Constructive behaviors refer to parental practices that organize a child's environment to facilitate their academic and social development (Fehrmann, Keith, & Reimers, 1987; Hill et al., 2004). Parental constructive behaviors include practices such as monitoring and structuring children's time, engaging in language and literary activities, teaching children adaptive skills and social norms, holding educational expectations, and encouraging and reinforcing desirable social behavior and child autonomy (Baumind, 1991; Denham, Renwick, & Holt, 1991; Epstein & Sanders, 2002; Fantuzzo, McWayne, Perry, & Childs, 2004). For example, a parent may oversee how a child spends his or her time after school, monitor who they play with, enforce family rules and routines, assist a child with his or her homework, and directly encourage a child to join a specific peer group (Chen, Dornbusch, & Liu, 2007). Parental constructive behaviors have been shown to facilitate a number of positive outcomes among children including positive peer relationships (Ladd, Profilet, & Hart, 1992), securely attached mother-child relationships (Kerns, Klepac, & Cole, 1996), and enhanced academic achievement (Fan & Chen, 2001).

Parental constructive behaviors have frequently been investigated with regard to young children's experiences with peers (Parke & Ladd, 1992). During play interactions with young children, parents have the opportunity to teach and model appropriate social skills such as turn-taking, synchronous exchanges, joint determination of content and direction of play, and appropriate emotional states to help young children acquire positive social behaviors which may then generalize to interactions with peers (O'Reilly & Bornstein, 1993). Parents also have the ability to influence children's social relationships by narrowing down children's pool of potential friends by selecting residential area and schools, arranging play visits, and enrolling children in specific programs to meet friends (Rubin & Sloman, 1984). In this sense, parents serve as gatekeepers in managing their child's relationship with peers by facilitating their child's contact with potential friends (Parke et al., 1989).

Parental behaviors have also been shown to influence peer relationships into adolescence (Chen et al., 2007). The display of parental constructive behaviors such as parental monitoring of how an adolescent spends his or her time after-school, management of family rules and routines, involvement in schoolwork, and the amount of time spent with adolescents was investigated to determine if parental constructive behavior may influence adolescent affiliation with peers over time. Students between the ages of 14- and 18-years completed a survey at two separate time points assessing adolescents' own education orientation (i.e., highest level respondents expected to go in school, amount of time spent on homework each week for math and English) and perceived orientation of friends. Results indicated that parental constructive behaviors were positively correlated with an adolescent's own education orientation and with the perceived achievement orientation of friends. Correlations were found to persist and become stronger over time. Consistent overlap was also found between the peers that adolescents choose

to associate with and those that parents endorse. Parents who display constructive behaviors continue to influence their child's choice of friends throughout their adolescence. The influence of parental constructive behaviors continues to remain significant as adolescence have more autonomy in selecting their own activities and as parental involvement in adolescents lives diminishes.

The importance of constructive parenting behaviors to promote school performance in young children has also been documented. The relationship between young children's school readiness, constructive parenting behaviors, parental involvement, and parental expectations were examined in a sample of high and low-income kindergarten students and their families (Hill, 2001). Specifically, children's pre-reading and pre-math skills were investigated along with parental disciplinary strategies, parental behaviors that support the parent-child affective relationship, parental involvement in school activities, and parental expectations for grades, the amount of time their child will spend in school, and expected future occupations. This study found that positive parenting behaviors such as warmth or acceptance was positively related to pre-reading and pre-math performance. The use of negative parenting strategies including having a temper and a lack of patience, was associated with lower pre-reading and pre-math scores. Parental school involvement was positively related to pre-reading performance. Furthermore, parental expectations for grades were positively related to children's pre-reading and pre-math performance; expectations for future occupations were related to pre-reading performance but not pre-math performance. The relationship between parenting behaviors and child school readiness outcomes was stronger for lower income families. Results from this study indicate that through their everyday interactions with their child, school involvement, and



academic expectations, parents are able to influence their child's school performance in their early academic years.

### *Support for Learning*

Early childhood is recognized as a sensitive period for the development of key cognitive, language, and literacy skills (Morrison & Cooney, 2002). During this time, early experiences within the family environment and through interactions between children and parents have consistently shown to be strong predictors of pre-academic skills, and later academic achievement and cognitive functioning (Bornstein & Tamis-LeMonda, 1989; McWayne, Hampton, Fantuzzo, Cohen, & Sekino, 2004). Parenting practices such as reading to children, using complex language, responsiveness, and warmth in interactions are all associated with improved developmental outcomes (Bradley, 1987). Stimulating activities may enhance development by helping children with specific skills (e.g., linking letters to sounds), and perhaps most importantly, by developing the child's ability and motivation concerned with learning in general. Additionally, it is possible that a feedback loop exists whereby parents are influenced by the child's level of attainment, which would lead to children with higher ability possibly receiving more parental stimulation.

It has been suggested that characteristics of the mother, child, and the mother-child dyad may predict the impact of parent-child interactions on parental scaffolding and child cognitive development. Cognitive characteristics of both mothers and children and dyadic characteristics (e.g., maternal agreeableness, attachment, sensitivity) were examined as predictors of effective scaffolding and cognitive development when children were in first grade (Mulvaney, McCartney, Bub, & Marshall, 2006). Results of multiple regression models indicate that children's early cognitive ability, maternal verbal intelligence, and shared sensitivity in the mother-child dyad

predicted effective scaffolding during an instructional task when children were in first grade. Effective scaffolding during the first grade assessment predicted child cognitive abilities at this time as well. These findings lend support to the transactional nature of parent-child relationships and the respective influence of parent and child characteristics on child cognitive outcomes. This study demonstrates that both children and their parents play an active role in shaping their experiences with one another and contributing to the quality of interactions and cognitive outcomes.

Parent behaviors and the home learning environment have important implications for preparing children to enter school and succeed academically. The connections between the parent-child relationship, the home learning environment, and school readiness were investigated in a study involving 173 mothers and children 3 to 4 years old enrolled in a Head Start program (Lamb Parker, Boak, Griffin, Ripple, & Peay, 1999). The parent-child relationship was measured by using the Parental Attitudes Toward Child Rearing Questionnaire (PACR; Easterbrooks & Goldberg, 1984). Aspects of the home learning environment were assessed in several areas: (a) how frequently the child helps with household tasks, (b) the number of educationally relevant play materials present in the home (e.g., toys and arts and crafts supplies suitable for young children), (c) the number of school-readiness skills the parent has helped the child learn, (d) how frequently the parent and child participated in school-related activities or talk about school, (e) parent's ability to facilitate the child's learning, and (f) parent's understanding of play. Child's school readiness was determined by three separate measures that assessed the child's behavior, cognitive development, and adaptation to the classroom. The home learning environment was associated with several child school readiness outcomes. Parents who spent more time facilitating the child's learning at home and helping their child

learn skills in home environment reported higher overall cognitive and language competencies and greater independence in the classroom. Parent behaviors described as strict and aggravated were negatively associated with a child's vocabulary, distractibility, considerateness, and hostility in the classroom. An increase in parental understanding of play predicted higher verbal intelligence, extroversion, creativity/curiosity, and independence. An increase in a parent's ability to facilitate the child's learning process predicted higher independence.

### *Support for Autonomy*

Support for autonomy is defined as parental behaviors that assist children in engaging in tasks independently through the demonstration of sustained attention, self-regulation, and emotional control (Clark & Ladd, 2000). A child's ability to maintain attention, control emotions, self-soothe, tolerate change, and function independently is an important developmental goal of early childhood and considered to be a marker of healthy development (Ryan, Deci, Grolnick, & La Guardia, 2006). Parental involvement and encouragement for their child's attempt to navigate their environment successfully is associated with a number of important developmental skills such as improved self-regulatory abilities (Davis & Burns, 2001), enhanced behavioral functioning over time (Colombo, 2002), and sustained attention during academic tasks to predict positive cognitive outcomes (Lawson & Ruff, 2004). Mothers who follow their child's cues, as opposed to redirecting their efforts, support infants' immature attention span and cognitive capacities by not requiring a shift in attentional focus (Tomasello & Farrar, 1986). Parental behaviors that attend to a child's current activity by supporting their interest, anticipating their needs, and responding contingently also assist children in expressing their desires and initiating activities in their own environment. Support for autonomy is important for a child's academic progress as self-reliance and autonomous functioning in the classroom is

associated with the degree to which children can benefit from the classroom environment (NICHD Early Care Research Network, 2008). Parental support for autonomy is also significantly related to reading and math achievement during early school years (NICHD Early Care Research Network, 2008).

The role of adult behaviors in supporting a child's independent exploration of their environment to facilitate learning and development was introduced through Vygotsky's concept of "zone of proximal development" (Vygotsky, 1978). Vygotsky's zone of proximal development is referred to as the difference between what a learner can do without help as determined by independent problem-solving and their level of potential development which is determined by what a learner can do with adult guidance or collaboration with more capable peers. At this level, adult support is critical for elevating a child's ability to accomplish goals beyond their autonomous performance. For children to develop a sense of autonomy in social interactions, mothers need to create a balance between providing direction and allowing the child to have a sense of control. The cooperative interaction between adults and children inside their zone of proximal development is often referred to as "scaffolding" by which a parent attempts to enlarge the child's zone of proximal development by taking their abilities into consideration and assisting them to function beyond their unassisted skill level. Ideally, adults control only those aspects that are beyond their child's capabilities and children progress from relying on others to assist them in solving problems to the internalization of the skills required to solve problems independently. Younger children need more direction and assistance than older children and premature children in particular often require more assistance in directing their attention to appropriate developmental tasks.

In a review of the literature examining the development of attention in infants and preschool children born premature, van de Weijer-Bergsma, Wijnroks, & Jongmans (2008) found that maternal scaffolding during parent-child interaction increased the complexity of infant exploratory play and this effect was more pronounced in medically high-risk premature infants than low-risk premature infants and infants born full-term. Mothers who used more attention redirecting behaviors (i.e., directing a child's attention to another object than the one already attended to by the infant) with 8-month-old infants born premature had children who showed less sustained attention when playing alone (Pridham, Becker, & Brown, 2000). On the other hand, parents who assisted children in maintaining active involvement with toys, decreased the demands placed on the infants' attentional system and facilitated exploration of play objects (Landry, Garner, Swank, & Baldwin, 1996). Thanh et al. (2007) also found that the higher quality of maternal interactive behaviors were related to better sustained attention in mothers who experienced low parenting stress, but not in mothers who experience high parenting stress.

Maternal behaviors that maintain or expand on infants' interests have been related to high levels of infant communication skills (Dunham & Dunham, 1995) and social competence (Rocissano et al., 1987). Smith et al. (1996) examined infant cognitive, language, and daily living skills in relation to mothers' use of warmth and sensitivity, directiveness, and strategies that maintained the infant's attention. High-risk and low-risk preterm infants and full-term infants from low income environments were involved in the current study with their mothers at 6 and 12 months of age. The development of high-risk infants was significantly related to the frequency with which mothers' used attention maintaining interactive behaviors with their child. In a challenging play situation, higher levels of maternal attention-maintaining at 6 months of age was more strongly related to expressive language skills at the same time point for the high-

risk infants in comparison to the low-risk and full-term infants. Higher levels of attention maintaining behaviors were also related to infants' development of cognitive and language skills in high-risk and low-risk infants. A mother's choice to maintain an infant's attention during interactions, as opposed to redirecting his or her behavior, may be seen as a sensitive interaction style which decreases the level of stimulation because it does not require the infant to shift attention to new aspects of the environment.

Parental attention-directing behaviors have also been shown to support the development of child social skills over time. Landry et al. (1998) investigated the changing nature of maternal interactive behaviors for medically high- and low-risk premature children and full-term controls. Children's social development was measured across 6, 12, 24, and 40 months of age in terms of responsiveness to mothers' attention directing behaviors and requests and initiations of social interactions. Maternal attention-directing was defined as any maternal verbal (questions, comments, directives) or nonverbal behavior (orienting gestures, demonstrations, giving of objects) directed toward the child. Two aspects of maternal attention-directing style were included in this investigation, maintaining and directiveness. Hierarchical linear modeling was used to examine the effect of maternal behaviors on growth in children's initiating and responding. Results indicate that mothers' use of higher levels of maintaining behaviors appear to support high- and low-risk children's increases in social initiating to a greater extent than full-term children. Children who experienced the highest degree of medical risk displayed faster gains in their initiating compared to low-risk and full-term children when their mothers provided even greater levels of support.

*Summary*

Premature children, and the situations that surround their births, present parents with a number of unique challenges. The experience of parenting a premature child is quite different in comparison to parenting a full-term child and is often marked by increased amounts of stress and a decreased sense of parenting self-efficacy. Studies that attempt to examine how maternal perceptions of efficacy may moderate the influence of maternal psychological distress on infant behavior have not been completed among children born premature. Because the prognosis for children born premature is so uncertain, it is critical to identify parental factors that can facilitate favorable development among children born premature.

Nurturing the relationship between parents and premature children is one way to protect the preterm baby from risk and foster healthy long-term development (Horowitz, 1987). An effective parent-child relationship is one that includes high levels responsiveness, acceptance, support of autonomy, and engagement in learning activities in the home environment (Lamb Parker et al., 1999). The origin of negative behaviors demonstrated by parents when interacting with their preterm child is unclear though research has suggested that differences in parenting behaviors may be attributed to prematurity, medical factors, environmental risk factors, parental feelings of guilt, anxiety, depression, stress, anger, and helplessness about their child's premature condition (Goldberg & DiVitto, 2002; Maloni, Kane, Suen, & Wang, 2002; Rose, 2000). As patterns of social interactions in infancy may have effects that persist for years, detailed examination of factors which can influence interactions between a parent and a premature child is warranted.

### *Research Questions*

This study investigated the extent to which specific parenting behaviors and the home environment are impacted by medical risk and parenting stress among parents of premature

children. This study examined the extent to which parental self-efficacy moderates the relationship between medical risk, parental stress, parent behaviors, and the home environment of premature children. The following questions were addressed:

1. What is the relationship between medical risk and parenting stress?
2. To what degree does parental self-efficacy moderate the relationship between medical risk, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children?
3. To what degree does parental self-efficacy moderate the relationship between parental stress, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) of premature children?

It was hypothesized that:

1. There would be a significant positive correlation between medical risk and parenting stress.
2. There would be a negative relationship between medical risk, parenting behaviors, and the home environment. It was further hypothesized that self-efficacy would moderate the relationship between medical history, parenting behaviors, and the home environment. Specifically, the negative impact of medical risk on parenting behaviors and the home environment would be smaller for parents who have a higher level of self-efficacy.
3. There would be a negative relationship between parenting stress, parenting behaviors, and the home environment. It was further hypothesized that self-efficacy would moderate



the relationship between parenting stress, parenting behaviors, and the home environment. Specifically, the negative impact of parenting stress on parenting behaviors and the home environment would be smaller for parents who have a higher level of self-efficacy.

## CHAPTER 3

### Methods

The purpose of this study was to examine the extent to which parental self-efficacy moderates the relationship between medical risk and parental stress on parent behaviors and the home environment of premature children. Approval to conduct this study was granted by Institutional Review Boards (IRB) at the University of Nebraska-Lincoln, University of Nebraska Medical Center, and Children's Hospital and Medical Center in Omaha, Nebraska (IRB# 20091110006FB). Moderational analyses using general linear models were used to explore (a) the direct effects of medical risk and parental stress on specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, and IT-HOME total score) and (b) the moderating role of parental self-efficacy on the behaviors and home environment of parents of premature children during in-home observations.

#### *Participants and Setting*

Seventy-two parent-child dyads of children 7 to 35 months corrected age who were enrolled in the Development Tracking Infant Progress Statewide (TIPS) program participated in this study. Fifty-four percent of child participants were female, 46% of participants were male. The mean age for children in this study was 16.11 months corrected age (range = 7.39 to 35.45 months). Children spent an average of 30.39 weeks in utero (range = 23.86 to 36.71 weeks). Children weighed on average 3.19 pounds at birth (range = 1.19 to 7.44 pounds) and spent an average of 59.03 days in the NICU following their birth (range = 7 to 270 days). Eighty-five percent of children received supplemental oxygen for an average of 74.39 days (range = 1 to 548 days). One child was still receiving supplemental oxygen when the study was conducted.

Eighty-one percent of children were white or non-Hispanic, 11% were Hispanic or Latino, and 4% biracial. Refer to Table 1 for descriptive statistics regarding children in the study sample.

The average age for maternal caregivers at the birth of the child involved in this study was 29.35 years (range = 14.00 to 43.00 years). The mean age for maternal caregivers at the birth of their first child was 26.42 years (range = 14.00 to 40.00 years). Eighty-six percent of maternal caregivers were white or non-Hispanic, 8% were Hispanic or Latino, 3% were African American, and 3% were included in the “other” category (e.g., biracial). Forty-nine percent of maternal caregivers worked full-time outside of the home and 18% had been diagnosed with a psychological condition. Of those diagnosed, 8% had been diagnosed with depression, 7% had been diagnosed with anxiety disorders, 1% had been diagnosed with bipolar disorder, and 1% had received diagnoses in the “other” category (e.g., postpartum depression). Six percent had been diagnosed with a co-morbid psychological condition (e.g., anxiety and depressive disorders). Sixty-one percent of families had private insurance. Fifty-one percent of maternal caregivers knew in advance of their child’s delivery that it was likely that their child would be born premature, 38% had other children that were born premature. Eighteen percent of maternal caregivers noted their children were born premature due to child medical concerns, 46% were born premature due to maternal health concerns, 24% were born premature as being part of a multiple birth set, and 13% did not know the cause of their child’s premature birth. Mothers reported how supportive individuals (e.g., child’s father/partner, relatives, friends, co-workers) and professional resources (e.g., social workers, child care providers) had been in terms of raising their child over the past 3 to 6 months. Mothers provided mean support ratings of 2.49, where a rating of 2 is “somewhat helpful” and a rating of 3 is “very helpful.” Ninety-three percent of mothers did not smoke or did not smoke after finding out they were pregnant. Five

Table 1

*Descriptive statistics for child participants*


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	Frequency	Percent
Gender		
Male	33	46
Female	39	54
Race		
White, Non-Hispanic	58	81
Hispanic or Latino	8	11
Black/African American	3	4
Biracial	3	4
Received supplemental oxygen		
Yes	61	85
No	11	15
Conditions experienced prior to NICU discharge		
Cardiac impairment	19	26
Delayed growth	22	31
Genetic conditions	2	3
Failed hearing screening	3	4
Infections during NICU stay	22	31
Respiratory impairments	42	58
Surgery	21	29
Vision impairments	12	17
Other (e.g., blood transfusion, jaundice, feeding concerns)	9	13

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Conditions requiring additional treatment  
following NICU discharge

Cardiac impairment	7	10
Delayed growth	18	25
Genetic conditions	1	1
Failed hearing screening	2	3
Infections during NICU stay	5	7
Respiratory impairments	23	32
Surgery	13	18
Vision impairments	12	17
Other (e.g., blood transfusion, jaundice, feeding concerns)	7	10

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percent of mothers reported smoking in their third trimester. One percent of mothers reported drinking alcohol after finding out they were pregnant and during their third trimester. None of the mothers involved in this study reported using recreational drugs before finding out they were pregnant or during their pregnancy. Refer to Table 2 for descriptive statistics regarding maternal caregivers.

Participants in this study were enrolled in the Developmental TIPS follow-up program. The TIPS program was established to provide neurodevelopmental follow-up to children who have received services in NICUs across the state of Nebraska. The TIPS program is a federally funded program through the Nebraska Department of Education and Health and Human Services in nine major NICUs across the state. Jackson and Needelman (2007) outlined the process for enrolling families in the TIPS program. All families of children that have spent at least 48 hours in the NICU receive information on the TIPS program. Regardless of the child's perceived risk for neurodevelopmental disability, families are provided with information on the TIPS program when they are discharged from the hospital and followed longitudinally to ensure they are aware of early intervention services throughout the state. Children are then screened or evaluated with standardized instruments or assessment procedures at specified times, generally 6, 16, and 24 months corrected age and 3 years chronological age. The type of screening procedure that is used is based on the child's assigned level of follow-up, with children at greater risk for neurodevelopmental disability followed more extensively over time.

### *Recruitment*

Participants were recruited for this study following a TIPS clinic appointment or through a mailing from the TIPS program. Children were eligible to participate if they were (a)

Table 2

*Descriptive statistics for maternal caregivers*


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	Frequency	Percent
Race		
White, Non-Hispanic	62	86
Hispanic or Latino	6	8
Black/African American	2	3
American Indian/Alaska Native	1	1
Other (e.g., biracial)	1	1
Marital status		
Married	58	81
Single, never married	7	9
Separated	2	3
With partner/not married	5	7
Primary language in home		
English	69	96
Spanish	1	1
Bilingual	2	3
Highest education level		
Less than high school diploma	3	4
GED	2	3
High school diploma	10	14
Training beyond high school, but not a degree	11	15
One year vocational training certificate	5	7
Associates degree	7	10

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Bachelor's degree	19	26
Some graduate coursework	4	6
Graduate college degree	11	15
Adults in the home		
One	4	6
Two	65	90
Three	2	3
Work status		
Full-time	35	49
Part-time	11	15
Unemployed	20	28
Looking for work	2	3
School/training full-time	5	7
School/training part-time	3	4
In military	1	1
Other (e.g., leave of absence)	9	13
Income level <sup>1</sup>		
8,000 or less	3	4
15,001 – 18,000	4	6
18,001 – 20,000	1	1
23,001 – 25,000	1	1
25,001 – 28,000	1	1
28,001 – 30,000	3	4
30,001 – 33,000	2	3

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33,001 – 35,000	2	3
38,001 – 40,000	2	3
40,001 – 43,000	1	1
43,001 – 45,000	2	3
45,001 – 48,000	1	1
48,001 – 50,000	3	4
Over 50,000	43	60
Suspected cause of premature birth		
Child medical concerns	13	18
Maternal health concerns	33	46
Multiple birth	17	24
Unknown	9	13

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<sup>1</sup> Four percent of survey responders did not provide data for their income level.

in the TIPS program, (b) between the ages of 6 and 36 months corrected age, and (c) living within 90 miles of a TIPS clinic site. Mothers who spoke a primary language other than English were excluded from this study due to a lack of reliability and validity of the instruments. Children born as part of a multiple birth set were invited to participate, though only one child selected at random during the home visit (i.e., determined by flipping a coin) was included in this study. Families who attended a scheduled follow-up appointment in a TIPS clinic were approached by the principal investigator at the conclusion of their appointment to receive information on the purpose of the study, discuss requirements of their participation, and obtain their informed consent. A mailing was also sent to eligible participants who attended an appointment in a TIPS clinic within the past six months. The mailing contained a letter describing the study and family participation. Families interested in participating mailed an interest form back to TIPS program staff and were contacted by the principal investigator to further discuss the study, review the consent form, and schedule a home visit. Fifty-six percent of participants were recruited from a public children's hospital, 24% were recruited from a university-affiliated medical setting, and 20% were recruited from a private hospital. Nineteen percent of families responded to the mailing inviting families to participate.

### *Constructs Measured*

The measures used to assess medical risk, parental stress, parental self-efficacy, parent behaviors, and the home environment are described in the following section (see Table 3 for a list of constructs, measures, and psychometric properties). Specifically, a brief description of the measure, coding and/or scoring procedures, and reliability and validity indices are reported.

### *Predictor Variables*

*Medical risk.* Medical risk was examined using a NICU medical history index that was

Table 3. *Measures and psychometric information*

Construct	Variables	Measures	Psychometric Properties	Psychometric Properties for Study Sample
NICU medical history	Medical risk	NICU Medical History Index	Developed by principal investigator, no psychometric properties available	Reliability = .83
Parental stress		Parenting Stress Index- Third Edition Short Form (PSI-SF; Abidin, 1995)	Reliability = .91	Reliability = .91
Parental self-efficacy		Parenting Sense of Competence (Johnston & Mash, 1989)- Efficacy scale	Reliability = .82	Reliability = .76
Parent behaviors	Parental responsivity	Infant/Toddler Home Observation for Measurement of the Environment (IT-HOME; Caldwell & Bradley, 1984) – Parental responsivity scale	Reliability = .44 to .89	<sup>a</sup> Reliability = .51
	Acceptance of child	IT-HOME (Caldwell & Bradley, 1984) – Acceptance of child scale	Reliability = .44 to .89	<sup>b</sup> Reliability = .47
	Parental involvement	IT-HOME (Caldwell & Bradley, 1984) – Parental involvement scale	Reliability = .44 to .89	Reliability = .50
Home environment	Organization of the environment	IT-HOME (Caldwell & Bradley, 1984) – Organization of the environment scale	Reliability = .44 to .89	Reliability = .18

Learning materials	IT-HOME (Caldwell & Bradley, 1984) – Learning materials scale	Reliability = .44 to .89	Reliability = .17
Variety in experience	IT-HOME (Caldwell & Bradley, 1984) – Variety in experience scale	Reliability = .44 to .89	Reliability = .33
IT-HOME total score	IT-HOME (Caldwell & Bradley, 1984) –Total score	Reliability = .89	<sup>c</sup> Reliability = .39

<sup>a</sup>Items 5 and 7 have zero variance, and were omitted from the reliability analysis.

<sup>b</sup>Item 16 has zero variance, and was omitted from the reliability analysis.

<sup>c</sup>Items 5, 7, and 16 have zero variance, and were omitted from the reliability analysis.

created for the purposes of this investigation (see Appendix A for a copy of the instrument). Mothers were asked to respond to questionnaire items assessing their child's health while in the NICU and if their child's health condition required additional care following hospital discharge. This inventory was created using variables involved in previous investigations examining perinatal characteristics of premature children (Brazy, Eckerman, Oehler, Goldstein, & O'Rand, 1991; DeMier et al., 2000; Fiese et al., 2001; Korner et al., 1993; Landry, Denton, & Swank, 1997). The health factors included in this measure are frequently used to predict long-term developmental outcomes of premature children and are often regarded as inclusion criteria for infants in NICU follow-up programs (Maccow et al., 2006; Vohr & Msall, 2004).

Medical risk was determined by identifying and quantifying medical risk factors associated with a child's premature birth from conditions experienced while in the NICU and following hospital discharge. One point was given for each of the following: gestational age less than 37 weeks, gestational age less than 32 weeks, gestational age less than 28 weeks, birthweight less than 2500g, birthweight less than 1500g, hospitalization for more than one week, hospitalization for more than one month, oxygen assistance for more than one week, and oxygen assistance for more than one month. Additionally, one point was given for having experienced any of the following conditions prior to discharge from the hospital: cardiac impairments, delayed growth (e.g., height, weight, head size), genetic conditions, failed hearing screening, infections during hospital stay (e.g., sepsis), respiratory impairments, vision impairments, or other postnatal conditions. An additional point was provided if any of the above conditions required care following hospital discharge or if the child received services for the targeted concern outside of those provided through the TIPS program.

Medical risk was calculated by summing the number of medical factors experienced by children as identified by parent participants. Risk scores may range from 0 to 27 with higher scores representing the presence of a greater number of medical risk factors. Total medical risk scores were used in this investigation.

*Parental stress.* Parental stress was examined using the *Parenting Stress Index- Third Edition Short Form (PSI-SF; Abidin, 1995)*. The PSI-SF is a direct derivative of the Parenting Stress Index (PSI) full-length test. The PSI-SF is a 36-item self-report scale that consists of three subscales: parental distress, difficult child characteristics, and dysfunctional parent-child interactions (see Appendix A for a copy of the instrument). Together the three scales make up a total stress index that indicates the overall level of stress an individual is experiencing in her role as a parent. Total stress index scores were used in this investigation.

Items on the PSI are answered on a 5-point Likert-type rating scale with responses ranging from “0 (*strongly disagree*)” to “4 (*strongly agree*).” Example items include: “I feel trapped in my responsibilities as a parent,” “My child is not able to do as much as I expected,” and “My child makes more demands on me than most children.” Raw scores for each subscale are calculated, and a sum of the scales is created to derive the total stress score. Raw scores are then converted into percentile scores to create a profile of parenting stress. Percentile scores were derived from the frequency distribution of the normative sample. Parents who obtain a Total Stress score at or above the 90<sup>th</sup> percentile are considered to be experiencing clinically significant levels of stress. Parents who obtain a Total Stress score within the 15<sup>th</sup> to 80<sup>th</sup> percentile are considered to be experiencing a normal amount of parenting stress.

A normative sample of 800 mothers who brought their child to a well-care pediatric visit was used to determine the reliability of the PSI-SF. The reported reliability for the total stress

index is .91 and internal consistencies of the subscales are: (a) .87 for Parental Stress; (b) .80 for Parent-child Dysfunctional Interaction; and (c) .85 for the Difficult Child scale (Abidin, 1995). Construct and predictive validity supporting the full-length PSI and PSI-SF scores have been produced across studies involving a range of child (e.g., those who experience developmental delays, traumatic injuries, externalizing behavior problems, chronic illnesses, language disorders) and family populations (e.g., teenage, adoptive, and depressed parents; Haskett, Ahern, Ward, & Allaire, 2006). The PSI has also shown strong correlations with other measures (e.g., Eyberg Child Behavior Inventory, Family Adaptability and Cohesion Evaluation Scales, and the Family Resources Scale; Abidin, 1995).

*Parental self-efficacy.* Parental self-efficacy was assessed using the Efficacy scale of the Parenting Sense of Competence Scale (PSOC; Johnston & Mash, 1989; see Appendix A for a copy of the instrument). The PSOC is a self-report scale that was used to measure the degree to which a parent feels competent and confident in handling child problems and coping during difficult situations. The Efficacy scale consists of 7 of the 16 items on the PSOC (i.e., items 1, 6, 7, 10, 11, 13, 15). Each item is rated on a 6-point Likert scale with response options ranging from “1 (*strongly disagree*)” to “6 (*strongly agree*).” Example items include: “The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired,” and “Being a parent is manageable, and any problems are easily solved.” Total raw scores for the seven items on the Efficacy scale were used in this study. Standardized scores are not available as this measure has not been normed.

The Efficacy subscale has been found to possess sufficient internal consistency estimates of .76 (Johnson & Mash, 1989) to .88 (Lovejoy, Verda, & Hays, 1997). Criterion-related validity (Johnson & Mash, 1989; Ohan, Leung, & Johnston, 2000) and construct validity for the

PSOC has been established among parents of children with diabetes (Rodrigue, Geffken, Clark, & Hunt, 1994), attention-deficit/hyperactivity disorder (ADHD; Banks, Ninowski, Mash, & Semple, 2008; Cunningham, 2007), autism (Rodger, Keen, Braithwaite, & Cook, 2008), developmental disabilities (Plant & Sanders, 2007), oppositional defiant disorder (Cunningham & Boyle, 2002), separation anxiety disorder (Eisen, Raleigh, & Neuhoff, 2008), and intellectual disabilities (Hassall, Rose, & McDonald, 2005; Hudson, Cameron, & Matthews, 2008; Mildon, Wade, & Matthews, 2008).

### *Outcome Variables*

*Parenting behaviors.* Parenting behaviors and the home environment were assessed using the Infant/Toddler Home Observation for Measurement of the Environment (IT-HOME) Inventory (Caldwell & Bradley, 1984; see Appendix B for a copy of the instrument). The IT-HOME was developed to measure the quality and quantity of stimulation and support provided to a child in the home environment. This measure focuses on the child in the home environment as a recipient of inputs from objects, events, and transactions occurring in connection with family and surroundings. The purpose is to understand the child's opportunities, experiences, and what life is like for the particular child in his or her most intimate surroundings. The IT-HOME was also created as a substitute for relying on socioeconomic status as an index of the adequacy of a child's home environment (Caldwell & Bradley, 1984).

The IT-HOME consists of 45 binary-choice items which load on to 6 subscales: (a) parental responsiveness, (b) acceptance of child, (c) organization of the environment, (d) learning materials, (e) parental involvement, and (f) variety in experience. Caldwell and Bradley (1984) provide descriptions for each of these subscales. *Parental responsiveness* describes the extent to which parents respond to their child's behavior with verbal, tactile, and emotional reinforcement



for desired behavior and communicates freely with their words and actions. Some items are scored based on responsivity of the parent to the data collector, based on the assumption that the parent's style of responding to the data collector will reflect patterns of social responses that can help to predict interaction patterns between parent and child. Sample items include, "Parent tells child name of object or person during the visit," "Parent initiates verbal interchanges with Visitor," and "Parent caresses or kisses child at least once." *Acceptance of child* refers to parental acceptance of poor behavior from the child and the avoidance of undue restriction and punishment. Sample items include, "No more than one instance of physical punishment during past week," "Parent does not express overt annoyance with or hostility to child," and "Parent does not interfere with or restrict child more than three times during visit." *Organization of the environment* describes the extent to which there is regularity and predictability in the family's schedule, safety in the home environment, and community services are utilized as part of the family's support system. Sample items include, "Child gets out of house at least four times a week," "Child is taken regularly to doctor's office or clinic," and "Child's play environment is safe." *Learning materials* involves provision and access to appropriate play and learning materials capable of stimulating development. Sample items include, "Muscle activity toys or equipment," "Simple eye-hand coordination toys," and "Parent provides toys for child to play with during visit." *Parental involvement* recognizes the extent to which a parent is actively involved in the child's learning and provides stimulation for increasingly mature behavior. Sample items include, "Parent talks to child while doing household work," "Parent structures child's play periods," and "Parent provides toys that challenge child to develop new skills." *Variety in experience* includes the involvement people and events that bring some variety, without disorganization, into the child's life. Sample items include, "Parent reads stories to child

at least three times weekly,” “Child eats at least one meal a day with mother and father,” and “Family visits relatives or receives visits once a month or so.” Subscales were divided into two categories to reflect specific parenting behaviors and aspects of a child’s home environment. Categories were created by the principal investigator. Subscales that assessed parenting behaviors that were directly observable during the in-home interview were placed in the parent behavior category (i.e., parental responsiveness, acceptance of child, parental involvement). Factors that assess social and physical aspects of the home environment (i.e., organization of the environment, learning materials, variety in experience, and IT-HOME total score) formed the home environment category.

During the home visit, parents participated in a semi-structured interview and data were collected on parenting behaviors and social and physical aspects of the home environment. Scores for each parenting behavior domain were calculated based on total raw scores. Scores for each subscale were added together to obtain scores for each domain. Subscales were then added together to derive the IT-HOME total score. Higher scores are indicative of higher quality parenting behaviors and more stimulating home environments. The IT-HOME has demonstrated adequate reliability and validity estimates among families from welfare and non-welfare backgrounds (Bradley, 1981; Bradley & Caldwell, 1984). Mean scores tend to increase with child age and that the standard error of measurement ranged from .89 to 1.14 for individual subscales and 2.55 for the total score (Caldwell & Bradley, 1984).

### *Procedures*

The procedures used to gather and analyze data for this study are described in greater detail in this section. Specifically, the procedures for data collection, data entry, interrater reliability training, and data analysis are described.

*Data collection.* Following the attainment of informed consent, a meeting was scheduled between families and trained research assistants in the family's home to collect data for this study. Research assistants made contact with mothers after receiving the referral from the principal investigator. The IT-HOME interview and observation was completed in the child's home during a 45 to 60 minute home visit at a time that was convenient for the child's mother and when the child was awake and alert. Visits were scheduled using the mother's availability but other family members (e.g., fathers, grandparents) living in the home and involved in caring for the child were invited to attend. Mothers received a reminder telephone call from the research assistant 24 hours before the scheduled visit.

The IT-HOME was the first measure administered during the home visit. Data collection for this measure involves a combination of direct observation and a semi-structured interview. Research assistants were encouraged to document information provided by caregivers during the observation and to have a comfortable, conversational interchange with the family. Research assistants often started the interview by asking the parent to describe the events of the previous day in the child's life. Research assistants used specific follow-up questions to obtain additional information to score each item. When more than one caregiver was present during the home visit, all behaviors exhibited by a caregiver with the target child during the visit were coded and used in completing the IT-HOME. After the semi-structured interview portion of the IT-HOME was complete, mothers were given a packet containing the NICU medical history index, parental stress, and parental self-efficacy measures. The remaining direct observation items on the IT-HOME were completed and the measure was scored in the family's home. Responses for all other measures were checked by the research assistant to ensure that all information was

collected before the research assistant left the family's home. Families were mailed a thank you note following their participation in the study.

*Data entry.* Data for medical risk (NICU Medical History Index total score), parental stress (PSI-SF total stress index score), parental self-efficacy (PSOC-Efficacy total raw score), parenting behaviors (parental responsivity, acceptance of child, parental involvement), and the home environment (organization of environment, learning materials, variety in experience, IT-HOME total score) were entered into an SPSS database by the principal investigator. A trained research assistant conducted random accuracy checks for 35% of data entry to ensure that information was entered accurately.

*Observer interrater reliability training.* Training of research assistants to code parent behaviors during home visits using the IT-HOME was provided by the principal investigator. Research assistants received direct instruction from a video and manual produced by the developers of the HOME inventory (Caldwell & Bradley, 1984). Research assistants practiced coding videos of home visits and discussed points of agreement and disagreement as a group until at least 85% interrater reliability was reached on three practice videos with a master key provided by the developers of the HOME inventory. Average reliability across all research assistants and the principal investigator on the three reliability training videos was 93%. Finally, research assistants and the principal investigator each conducted two home visits with families of children born premature to practice completing the IT-HOME reliably in a live setting. Reliability checks were conducted across pairs of research assistants until at least 85% interrater reliability was achieved. Average reliability across all research assistants and the principal investigator on two in-home practice visits was 97%. Once reliability criteria were reached for

each coder, research assistants were eligible to conduct home visits independently with families referred for participation in this study.

Scheduled checks for reliability were conducted throughout data collection. For each reliability check, two research assistants attended the home visit with the family and completed the IT-HOME independently. If research assistants reached at least 85% agreement, they were approved to continue coding. If research assistants were below 85% agreement, a discussion session was held with both research assistants and the principal investigator. Research assistants discussed information gathered from the home visit that led them to provide a specific rating. Points of disagreement were discussed until a consensus was reached among research assistants and the principal investigator and at least 85% agreement was reached. Notes from discussion sessions were collected and distributed amongst all research assistants for future reference. Inter-rater reliability checks were conducted for 35% of the home visits. Interrater agreement was considered to be established if two ratings were identical to one another. Interrater agreement for all research assistants was 90%, a figure comparable to that reported in other studies which have used the IT-HOME with premature children (Bradley et al., 1994).

*Data analysis plan.* Moderation analyses using general linear models were used to explore the (a) the main effects of medical risk and parental stress on specific parenting behaviors (i.e., i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of environment, learning materials, variety in experience, IT-HOME total score) and (b) the moderating role of parental self-efficacy on specific behaviors and the home environment of parents of premature children. It was hypothesized that there would be a significant positive correlation between medical risk and parenting stress, and a negative relationship between medical risk, parenting behaviors, and the home environment; a

significant positive correlation was also expected between parenting stress, parenting behaviors, and the home environment. It was further hypothesized that parent self-efficacy would moderate the relationship between medical risk, parenting behaviors, and the home environment, and between parenting stress, parenting behaviors, and the home environment.

Analysis of the moderation model was tested using general linear models with the full information maximum likelihood estimation method. Medical risk, parental stress, and parent self-efficacy served as exogenous variables. Endogenous variables were parenting behaviors and the home environment. The degree to which parental self-efficacy moderates the relationship between medical risk and parental stress, parenting behaviors, and the home environment was tested. Moderation was investigated by testing the significance of the coefficient of the interaction term in the model. The model was conducted for each dependent variable. The two main effects in the model are the coefficients for stress and efficacy. The proposed models are as follows:  $IT-HOME = \beta_0 + \beta_1 \text{Medical Risk} + \beta_2 \text{Efficacy} + \beta_3 (\text{Medical Risk} * \text{Efficacy}) + e$ ; and  $IT-HOME = \beta_0 + \beta_1 \text{Stress} + \beta_2 \text{Efficacy} + \beta_3 (\text{Stress} * \text{Efficacy}) + e$ , where  $\beta_0$  is the intercept and the error term  $e$  is assumed to be normally distributed with a mean of zero. The parameters of interest in this study were the moderation effects ( $\beta_3$ ), however main effects were included in the model when testing for moderation. These parameters reflect the extent to which parental self-efficacy moderates the relationship between medical risk and parental stress, respectively, and parent behaviors and the home environment. The two main effect variables in each model were mean centered to remove non-essential multicollinearity between the main effects and the interaction term (Little, Bovaird, & Widaman, 2006). Analyses were then conducted using total score values for each variable involved in this investigation.

## CHAPTER 4

### Results

Results of all analyses are described in the following section. Descriptive statistics, preliminary analyses, and moderational analyses are included.

#### *Descriptive Statistics*

Descriptive statistics for study measures were computed. Refer to Table 4 for descriptive statistics for medical risk (NICU Medical History Index), parental stress (PSI-SF), parental self-efficacy (PSOC-Efficacy scale), parent behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of the environment, learning materials, variety in experience, IT-HOME total score).

*Medical risk.* Total raw scores were computed for the NICU medical history index to assess children's health while in the NICU and following hospital discharge. The NICU medical history index was created for the purposes of this investigation and as a result, clinical cutoff information is not available. Medical risk scores may range from 0 to 25 with higher scores representing the presence of a greater number of medical risk factors. The mean medical risk score was 9.57, indicating that children in this sample did not experience a substantial number of medical risk factors while in the NICU and following hospital discharge. Absolute skewness and kurtosis values (0.81 and 0.40, respectively) indicate that data for the NICU medical history index was normally distributed.

*Parental stress.* Total stress scores for mothers were determined using total raw scores for the PSI-SF. A raw score of 90, which is at or above the 90<sup>th</sup> percentile, is indicative of clinically significant levels of stress. Parents who obtain a Total Stress score within the 15<sup>th</sup> to 80<sup>th</sup> percentile are considered to be experiencing a normal amount of parenting stress. The mean

Table 4

*Descriptive statistics for study measures*

Measures	N	Min	Max	Mean	SD	Skew	Kurtosis
NICU Medical History Index	72	2.00	23.00	9.57	4.77	0.81	0.40
Parenting Stress Index - Third Edition Short Form	72	42.00	123.00	71.42	18.02	0.39	-0.33
Parenting Sense of Competence - Efficacy scale	72	24.00	41.00	33.42	4.24	-0.20	-0.64
IT-HOME - Parental responsivity scale	72	7.00	11.00	9.90	1.18	-0.87	-0.20
IT-HOME - Acceptance of child scale	72	2.00	8.00	6.39	1.37	-0.98	0.81
IT-HOME - Parental involvement scale	72	1.00	6.00	4.90	1.24	-1.43	2.21
IT-HOME - Organization of the environment scale	72	2.00	6.00	4.94	0.98	-0.82	0.22
IT-HOME - Learning materials scale	72	6.00	9.00	8.35	0.82	-1.20	0.89
IT-HOME - Variety in experience scale	72	1.00	5.00	4.18	0.91	-1.07	1.03
IT-HOME –total score	72	29.00	44.00	38.67	2.78	-0.61	1.14



score on the PSI-SF was 71.42. The number of caregivers scoring below the 90<sup>th</sup> percentile was 83.3%, with 16.7% of caregivers scoring above the 90<sup>th</sup> percentile in the clinically significant range. This indicates that a majority of mothers in this sample were not experiencing a clinically significant level of parenting stress. Absolute skewness and kurtosis values (0.39 and -0.33, respectively), indicate that data for the PSI-SF Total Scale were not normally distributed.

*Parental self-efficacy.* Parental self-efficacy scores were computed based on total raw scores for the Efficacy subscale of the PSOC. The possible range of efficacy scores was 7 to 42, with higher scores indicating a greater sense of parental competence. The mean total parental self-efficacy score was 33.42. Thus, most caregivers in this sample rated themselves as feeling competent and confident in handling child problems and coping during difficult situations. Absolute skewness and kurtosis values (-0.20 and -0.64, respectively) revealed that data for the PSOC-Efficacy subscale were not normally distributed.

*Parent behaviors.* Parent behaviors and social and physical aspects of the home environment were examined using the IT-HOME. The IT-HOME consists of 45 binary-choice items which load on to 6 subscales: (a) parental responsiveness, (b) acceptance of child, (c) organization of the environment, (d) learning materials, (e) parental involvement, and (f) variety in experience. The IT-HOME total score is the sum of the 6 subscales. Parental behaviors were assessed using the parental responsiveness, acceptance of child, and parental involvement factors. Organization of environment, learning materials, variety in experience, and IT-HOME total score was used to assess the child's home environment. Scores for all subscales and the IT-HOME total score were computed based on total raw scores for each variable. Results for each of these subscales are described below. See Appendix C for results of confirmatory factor analysis of the IT-HOME.

*Parental responsivity.* The mean parental responsivity ratings was 9.90. The possible range of parental responsivity scores was 0 to 11, with 0 being low and 11 being highly responsive. Skewness and kurtosis values for this subscale were 0.87 and -0.20 respectively.

*Acceptance of child.* The mean rating for acceptance of child was 6.39. The possible range of scores was 0 to 8, with 0 being low acceptance of child and 8 being higher acceptance of child. Skewness and kurtosis values for this subscale were -0.98 and 0.81 respectively.

*Parental involvement.* The mean rating for parental involvement was 4.90. The possible range of scores was 0 to 6, with 0 indicating less parental involvement and 6 indicating higher parental involvement. Skewness and kurtosis values for this subscale were -1.43 and 2.21 respectively.

*Organization of the environment.* The mean rating for organization of the environment was 4.94. The possible range of scores was 0 to 6, with 0 indicating low organization of the environment and 6 indicating high organization of the environment. Skewness and kurtosis values for this subscale were -0.82 and 0.22 respectively.

*Learning materials.* The mean rating for learning materials was 8.35. The possible range of scores was 0 to 9, with 0 being less access to learning materials and 9 being greater access to learning materials. Skewness and kurtosis values for this subscale were -1.20 and 0.89 respectively.

*Variety in experience.* The mean rating for variety in experience was 4.18. The possible range of scores was 0 to 5, with 0 being less variety and 5 being greater

variety in experience. Skewness and kurtosis values for this subscale were -1.07 and 1.03 respectively.

*IT-HOME total score.* The mean rating for the IT-HOME was 38.67. The possible range of scores was 0 to 45, with 0 being less stimulation and support provided to the child in their home environment and 45 being more stimulation and support in the child's home environment. Skewness and kurtosis values for this subscale were 0.61 and 1.14 respectively.

### *Preliminary Analyses*

Prior to conducting the moderation analyses, the relationship between medical risk and parenting stress was examined. Correlations among medical risk and parenting stress are presented in Table 5 along with correlations for all variables included in this study. The relationship between medical risk and parenting stress was not significant ( $r=.17, p>.05$ ). Medical risk was not significantly related to any of the variables involved in this investigation. Parenting stress was negatively and significantly associated with parenting self-efficacy ( $r=-.51, p<.01$ ), acceptance of child ( $r=-.25, p<.05$ ), and the IT-HOME ( $r=-.26, p<.05$ ). A significant and positive relationship was found between parental self-efficacy and the IT-HOME ( $r=.35, p<.01$ ). Finally, small to moderate positive correlations, ranging from  $r=.39$  to  $.57$ , were found among all IT-HOME scales except for organization of the environment.

### *Moderation Analyses*

Moderation analyses were used to test whether parental self-efficacy moderated the relationship between medical risk and specific parenting behaviors and the overall home environment and parenting stress and specific parenting behaviors and the overall home environment. Total scores for medical risk, parental self-efficacy, and parental stress were mean

Table 5

*Correlations among study variables*

Variable	1	2	3	4	5	6	7	8	9	10
1. Medical risk	--	.17	.07	.12	-.04	-.01	.02	.10	.19	.14
2. Parenting stress		--	-.51**	.07	-.25*	-.06	-.09	-.17	-.15	-.26*
3. Parental self-efficacy			--	.15	.06	.05	.22	.23	.22	.35**
4. Parental responsiveness				--	.01	.04	.09	.08	.19	.57**
5. Acceptance of child					--	-.15	-.03	-.06	-.04	.39**
6. Organization of the environment						--	-.19	-.09	-.00	.20
7. Learning materials							--	.27*	.20	.44**
8. Parental involvement								--	.00	.50**
9. Variety in experience									--	.45**
10. IT-HOME total score										--

\* $p < .05$ .\*\* $p < .01$ .

centered before being analyzed and entered into the moderation model. The extent to which parental self-efficacy moderated the relationship between medical risk, specific parenting behaviors, and the overall home environment is presented in Table 6. There was a significant interaction for the moderating effect<sup>1</sup> of parental self-efficacy on the relationship between medical risk and acceptance of child ( $r=.04$ ,  $\beta=.017$ ,  $t(72)=2.15$ ,  $p<.05$ ) and organization of the environment ( $r=.03$ ,  $\beta=.017$ ,  $t(72)=2.15$ ,  $p<.05$ ). Figures 5 and 6 illustrate the moderating role of parental self-efficacy on the relationship between medical risk, acceptance of child, and organization of the environment. Figures 5 and 6 were created by calculating predicted outcome scores associated with values that were considered high and low for each predictor (i.e., one standard deviation above and below the mean value; Cohen, Cohen, West, Aiken, 2003). As shown in Figure 5, there is a negative relationship between medical risk and acceptance of child for mothers with a low sense of parenting self-efficacy. For mothers with a low sense of parental self-efficacy, acceptance of child decreases, when medical risk is high. For mothers with high parental self-efficacy, the relationship between medical risk and acceptance of child becomes more positive, when medical risk is high. In Figure 6, the relationship between medical risk, organization of the environment, and parental self-efficacy is shown. There is a negative relationship between medical risk and organization of the environment for mothers with low self-efficacy. For mothers with a low sense of parental self-efficacy, organization of the environment decreases, when medical risk is high. For mothers with a high sense of parental self-efficacy, organization of the environment increases, when medical risk is high. Moderation analyses were also used to examine the moderating effect of parental self-efficacy on the relationship between parenting stress and specific parent behaviors. There was a significant interaction for the

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<sup>1</sup> The tests of moderation involved multiple related (i.e. dependent) comparisons suggesting a potential inflation of the family-wise error rate. To address this issue, adjusted p-values based on the Bonferroni-Holm procedure are also provided. All p-values using this procedure were  $>.05$ .

Table 6

*Interaction effects of parental self-efficacy on medical risk, specific parenting behaviors, and the overall home environment*

Medical Risk						
Outcome	Estimate	Standard Error	df	T-score	p-value	Adjusted <sup>2</sup> p-value
Parental responsiveness	-.000	.007	72	-.041	.97	.97
Acceptance of child	.018	.008	72	2.15	.04*	.12
Parental involvement	-.009	.007	72	-1.15	.25	.50
Organization of the environment	.013	.006	72	2.29	.03*	.12
Learning materials	-.007	.005	72	-1.36	.18	.54
Variety in experience	-.003	.005	72	-.52	.61	.86
IT-HOME total score	.013	.016	72	.78	.43	.86

\* $p < .05$ .

<sup>2</sup> Bonferroni-Holms adjusted p-values.

Figure 5

*Interaction effects for medical risk, acceptance of child, and parental self-efficacy*

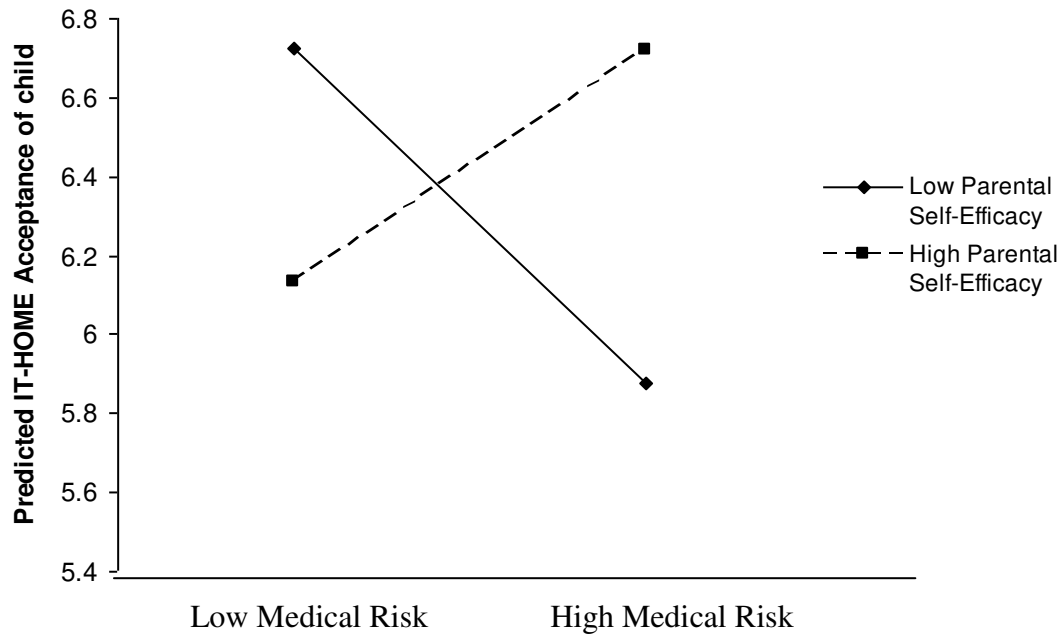
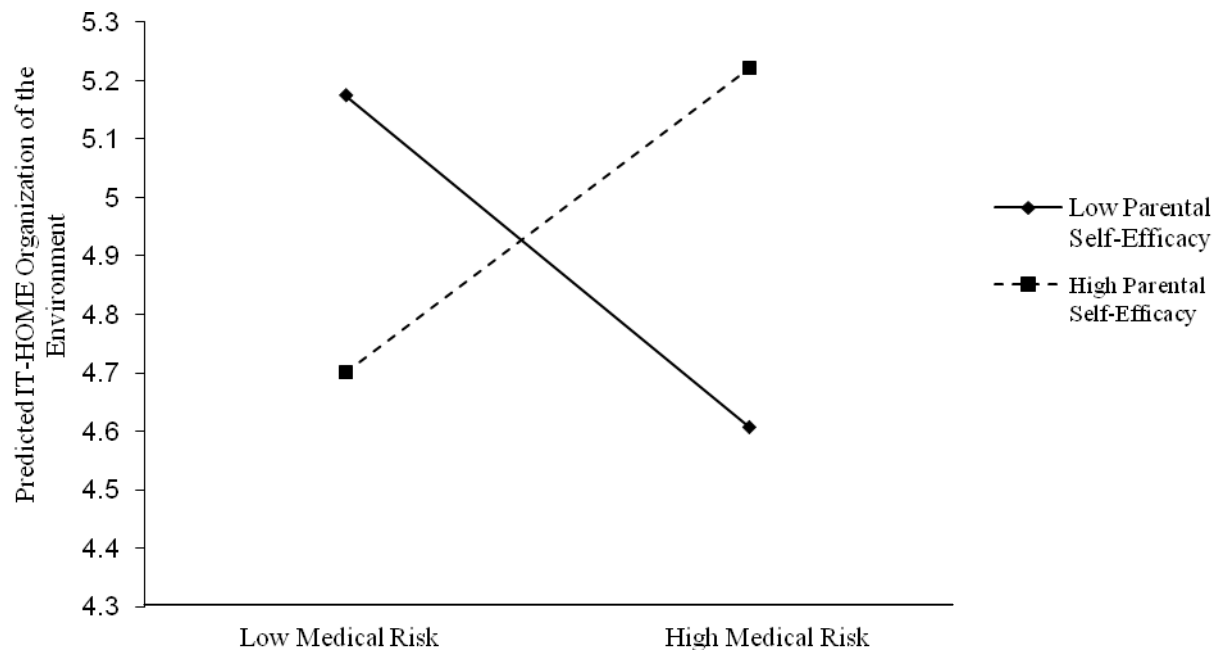


Figure 6

*Interaction effects for medical risk, organization of the environment, and parental self-efficacy*

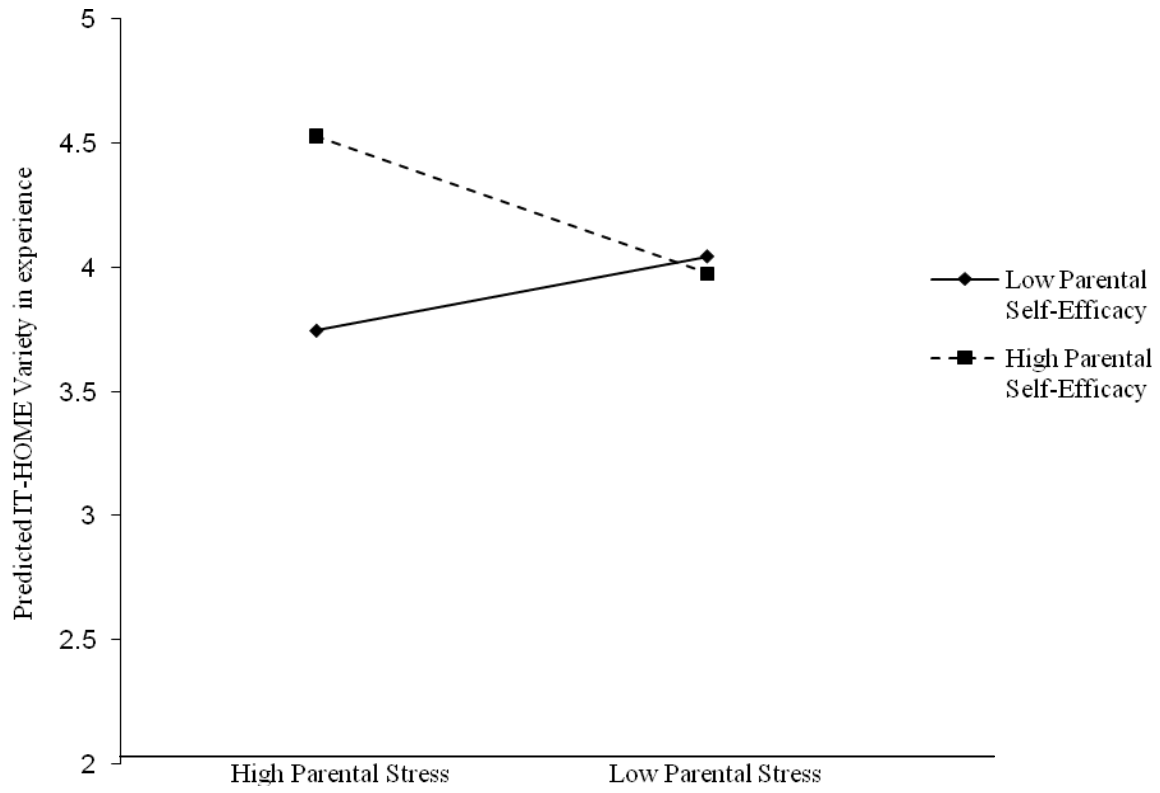




moderating effect of parent self-efficacy on the relationship between parenting stress and variety in experience ( $r=.03$ ,  $\beta=.017$ ,  $t(72)=2.15$ ,  $p<.05$ ). This relationship is shown in Figure 7. Figure 7 was also created by calculating predicted outcome scores associated with values that were considered high and low for each variable (i.e., one standard deviation above and below the mean; Cohen et al., 2003). For mothers with a low sense of parental self-efficacy, the relationship between parenting stress and variety in experience becomes more positive, as parenting stress increases. For mothers with high parental self-efficacy, variety in experience decreases, as parenting stress increases.

Figure 7

*Interaction effects for parental stress, variety in experience, and parental self-efficacy*



## CHAPTER 5

### Discussion

The purpose of this study was to examine the extent to which parental self-efficacy moderates the relationship between medical risk and parental stress on specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of the environment, learning materials, variety in experience, IT HOME Total Score) of premature children. Medical risk was not significantly related to parenting stress. Results of moderation analyses yielded interesting interactions worthy of further investigation. In particular, findings indicate that parental self-efficacy may reduce the adverse effects of medical risk and parenting stress on the behaviors that parents exhibit during interactions with premature children. Results have important meaning for parents of premature children and NICU follow-up programs. Variables included in this study are worthy of continued investigation among this population.

#### *Findings*

Main findings and implications will be discussed in the following section. Findings will be presented for the main effects of medical risk and parenting stress, followed by findings for moderational analyses (i.e., degree to which parental self-efficacy moderates the relationship between medical risk and parenting stress on specific parenting behaviors and the home environment).

*Direct effect of medical risk.* Medical risk was examined using a NICU medical history index assessing, among other things, risk status. The NICU medical history index was created for the purposes of this study to assess children's health conditions while in the NICU and following NICU discharge. Health conditions that are frequently used to predict long-term

developmental outcomes of premature children were included, along with perinatal factors that are often regarded as inclusion criteria for infants in NICU follow-up programs (Maccow et al., 2006; Vohr & Msall, 2004).

Mothers of premature children frequently report increased levels of stress compared to mothers of children born full-term (Hughes, & McCollum, 1994; Kaaresen, Ronning, Ulvund, & Dahl, 2006; Spear, Leef, Epps, & Locke, 2002). Medical risk was not significantly related to parenting stress. This indicates that the health conditions that children experience while in the NICU and following NICU discharge do not adversely affect the amount of stress experienced by parents of children born premature included in this sample. While this finding is encouraging for families of premature children, it is also surprising given the plethora of research suggesting that parents frequently experience increased levels of stress following their child's premature birth (Cronin et al., 1995; Davis et al., 2003; Lahner & Hayslip, 2003; Lau & Morse, 2003; Singer et al., 1999). This finding is also unexpected given that previous research suggests that parental stress is often linked to the degree of infant prematurity and infant medical status at hospital discharge (Auslander, Netzer, & Arad, 2003; Teti et al., 1996).

Premature children may experience a number of medical conditions following their birth that place them at risk for long-term impairment. Medical conditions that premature children frequently experience include intraventricular hemorrhage (IVH), asphyxia, central nervous system infections, respiratory problems, and gastrointestinal and immune system concerns (Aylward, 2003). It is important to capture the variety of medical conditions that may impact parent well-being in early infancy. Previous investigations involving premature children and their families have frequently examined the effect of a single medical (e.g., low birthweight) or developmental (e.g., poor cognitive development) concern on parent psychological functioning

(Grote et al., 2010; Melnyk, Crean, Feinstein, & Fairbanks, 2008; Poehlmann et al., 2009; Rowe & Jones, 2010). Few studies have examined the effect of cumulative medical risk on maternal stress. Candelaria and colleagues (2006) examined the impact of cumulative psychosocial risk and cumulative medical risk on maternal reports of parenting stress in early infancy. Cumulative psychosocial risk, not cumulative medical risk, was found to predict maternal reports of parenting stress at hospital discharge.

The severity of a child's medical condition, gestational age, birthweight, length of hospital stay, and health care needs following hospital discharge have been shown to influence parenting stress in the years following a child's premature birth (Drotar et al., 2006; Kuster & Merkle, 2004; Singer et al., 1999). For this study, health conditions experienced by a child while in the NICU and following hospital discharge were combined to yield a medical risk score. The average medical risk score for children involved in this study was 9.57 (range 2 to 23). This information suggests that children in this sample did not experience an elevated number of medical risk factors in the hospital and following hospital discharge. As such, mothers may not be expected to report an increased level of parenting stress. In fact, only 16.7% of mothers reported stress levels above the 90<sup>th</sup> percentile, in the clinically significant range. Data were shown to be significantly skewed which presents a lack of variability, which may account for the lack of direct effects for medical risk and parenting stress in this sample. This finding is consistent with the study conducted by Candelaria et al. (2006), in that medical risk was not significantly related to parenting stress.

The timing in which the study was conducted may account for reduced levels of parenting stress in this sample. The average age for children involved in this study was 16.11 months corrected (range = 7.39 to 35.45 months corrected). From the time their child was born

prematurely to when mothers participated in this study, caregivers had the opportunity to gain familiarity with their child's medical needs, the requirements of providing care for their child on a daily basis, and mothers may have learned to manage expectations for their child given their child's medical and developmental prognosis. It is possible that once the main stressors of a premature birth and subsequent hospitalization were eliminated, parenting stress decreased. Therefore, the amount of time between hospital discharge and when this study was conducted may have resulted in reduced reports of parenting stress.

Mixed findings have been discovered with regard to the length of time in which stress levels remain elevated for mothers of premature children. Mothers of premature children may experience heightened levels of stress for 3 to 5 years after their child's birth (Cronin et al., 1995; Singer et al., 1996). Stress is often greatest in the first year following a child's premature birth, after which time stress may decrease to be comparable to parents of full-term children after one year (Majnemer et al., 2007; Stjernquist, 1996). Mothers of high-risk premature infants with a more complicated neonatal course have reported more symptoms of distress at 2 years, more negative family impact at 2 and 3 years, and more parenting strains and illness stressors at 3 years (Singer et al., 1999). Severity of medical risk may also influence the extent to which mothers report feelings of stress within the first year of their child's premature birth, and symptoms may decrease over time. However, when children were 3 years old, reported psychological distress for these families was not different from full-term mothers except that mothers of high-risk premature children regarded their children as more demanding. Lee et al. (1991) found that parents of young preschool children that were born premature and experienced cognitive delays did not report greater personal, family, or financial strains than parents of full-term children when assessed at the same time point. This study also found that parents of

typically developing premature children actually reported less negative family and personal impact than the control group of parents of healthy full-term children.

Therefore, for exploratory purposes, additional analyses were conducted to determine if mothers of premature children of different age cohorts in the present sample reported differences on study variables<sup>3</sup>. When child age was taken into consideration, analyses provided some unique and interesting insight into the study findings. There was a significant effect of child age on medical risk, parental responsiveness, acceptance of child, and variety in experience. It may be expected that children 2 to 3 years corrected age would have higher medical risk scores than younger child participants. Children who participate in the TIPS program over time are expected to experience more significant and sustained medical needs than younger children who would have been discharged from the program as their medical and developmental prognosis improved. Parental responsiveness may be higher for children 1 year corrected age or older as these children may have a better understanding for the behaviors to exhibit to receive verbal and emotional reinforcement from their caregivers. The opposite may hold true for older children with regard to parental acceptance. Children under 1 year of age may exhibit fewer behaviors that require parents to use unnecessary restriction and punishment. However, older children may be more likely to test boundaries and engage in behaviors that require parents to use physical restriction and punishment to manage their behavior. Finally, mothers of premature children less than 1

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<sup>3</sup> A one-way ANOVA was conducted to compare the effect of child age on medical risk, parenting stress, parental self-efficacy, specific parenting behaviors, and the home environment. There was a significant effect of child age on medical risk ( $p = .01$ ), parental responsiveness ( $p = .01$ ), acceptance of child ( $p < .01$ ), and variety in experience ( $p = .01$ ). Post-hoc analyses were conducted to make comparisons among different age cohorts. Children were grouped according to their age at the time the study was conducted; groups consisted of children less than 1 year corrected age ( $N = 34$ ), 1 to 2 years corrected age ( $N = 27$ ), and 2 to 3 years corrected age ( $N = 11$ ). Significant differences in scores for medical risk for children 2 to 3 years corrected age were found (Mean difference = 4.48;  $p = .01$ ) when compared to children less than 1 year corrected age. There was a significant difference in scores for parental responsiveness for children 1 to 2 years corrected age (Mean difference = 0.83,  $p = .01$ ) and children 2 to 3 years corrected age (Mean difference = .80,  $p = .04$ ) in comparison to children less than 1 year corrected age. There was a significant difference in scores for acceptance of child for children less than 1 year corrected age when compared to children 1 to 2 years corrected age (Mean difference = 0.76,  $p = .02$ ) and children 2 to 3 years corrected age (Mean difference = 1.55,  $p < .01$ ). Significant differences were also found in scores for variety in experience for children less than 1 year corrected age when compared to children 1 to 2 years corrected age (Mean difference = -.59,  $p = .01$ ) and children 2 to 3 years corrected age (Mean difference = -.69,  $p = .02$ ).

year corrected age may be less likely to include people or events that bring variety to the child's life due to their child's premature status and the medical conditions they may continue to experience after hospital discharge. Mothers may feel they need to learn to manage their child's health condition and daily caregiving needs before sharing caregiving chores and daily responsibilities with other family members. Thus, results indicate that parents may display different behaviors with premature children at different ages. However, these post-hoc analyses should be interpreted with caution due to the low sample size for each age cohort.

Findings may also be influenced by the unique group of children and families that were included in this study. Mothers involved in this investigation possessed a number of characteristics that may buffer the adverse effects of prematurity. A majority of mothers were married (81%), reported annual household incomes over \$50,000 (60%), and obtained educational training beyond that of an associate's degree (57%). Fifty-one percent of mothers reported that they knew in advance that their child was likely to be born premature, 46% of children were born premature due to maternal health concerns, and 38% of mothers had other children that were born premature. Such mothers may be more likely to seek out services and supports provided through the TIPS program. Child participants consisted of premature children that were enrolled in a NICU follow-up program and had been assigned to a Level II follow-up category. Children at this level were considered to be at *moderate* risk for developmental problems and were not enrolled in early intervention at the time of hospital discharge. Level II follow-up does not represent the most extensive level of care for NICU follow-up programs that served as recruitment sites for this study. As a result, children enrolled in Level II care may be expected to have reduced scores on the NICU medical history index, in comparison to children at a more extensive level of care. Mothers may report reduced stress levels as their child's needs



are not severe enough to warrant Level III follow-up care or immediate enrollment in early intervention. It may also be that mothers of children at increased risk would not have consented to have their child participate in this study if their child was experiencing medical difficulties at the time of recruitment.

Furthermore, it is important to note that all families were enrolled in a neurodevelopmental follow-up clinic for NICU graduates at the time in which the study was conducted. Through this clinic, families were followed longitudinally and evaluated at regular intervals up to 3 years corrected age by an interdisciplinary team consisting of a developmental pediatrician, developmental specialist, rehabilitation specialist (e.g., physical and occupational therapist) and nurse. Parents of all infants who were in the NICU for at least 48 hours, regardless of the child's perceived risk for neurodevelopmental disability, were invited to participate in the follow-up clinic and provided written information on early intervention services in the state. Information is unavailable regarding characteristics of families that enroll in this particular NICU follow-up service versus families that decline to participate. Families involved in the NICU follow-up clinic received regular feedback on their child's medical and developmental needs and were able to consult with an experienced team of early intervention professionals throughout their enrollment. Studies investigating service utilization of families of NICU graduates found that demographic characteristics (e.g., ethnicity, parent education levels) have not predicted service use (Tien, Peterson, & Shelley, 2002), however it is unclear if this finding is consistent for families who declined participation in the NICU follow-up clinics that served as recruitment sites for the present study.

### *Moderation Analyses*

Moderation analyses revealed several interesting patterns of interactions related to the role of parental self-efficacy for parents of children born with medical risk. First, parental self-efficacy appeared to influence the relationship between medical risk and acceptance of child and organization of the home environment. For mothers with a low sense of parenting self-efficacy, as medical risk increased, acceptance of child appeared to decrease. For mothers with a high sense of parenting self-efficacy, as medical risk increased, the relationship between medical risk and acceptance of child became more positive. Mothers who feel less competent and confident in their ability to handle child problems and cope during difficult situations may be more likely to appear frustrated and annoyed with their child's behavior, and more likely use physical restriction and punishment to manage their child's behavior. As medical risk increased, mothers who possessed an increased sense of parenting self-efficacy may be more accepting of their child's difficult behaviors and avoided the use of unnecessary restriction and punishment.

Second, self-efficacy appeared to moderate the relationship between medical risk and organization of the home environment. When mothers with children with a greater number of medical risk factors experienced low parenting self-efficacy, there appeared to be less regularity and predictability in their family's schedule, more unsafe features in the home environment, and a lower likelihood of utilizing community services. For mothers with high parental self-efficacy, the relationship between medical risk and organization of the environment became more positive as medical risk increased. Thus, parental self-efficacy was shown to influence the extent to which mothers create consistent and predictable schedules, take advantage of community services and resources, and create safe home environments for premature children in this study. It should be noted that once p-values for the moderation analyses were adjusted to account for multiple tests, the interactions were no longer significant. These findings are nonetheless

clinically interesting and represent fruitful areas worthy of focused investigation with a larger sample size.

In addition, parental self-efficacy influenced the relationship between parenting stress and variety in experience. For mothers with a low sense of parental self-efficacy, as parenting stress increases, the relationship between parenting stress and variety in experience became more positive. Interestingly, for mothers with a high sense of parental self-efficacy, as parenting stress increased, variety in experience was found to decrease. Mothers with a low sense of parenting efficacy may feel that other adults are better suited to care for their child and as their stress level increases, such mothers may be more inclined to ask others to assist in providing care for their child. Mothers with a high sense of parenting self-efficacy may have heightened expectations for their behavior and their ability to care for their child even in times of stress. As a result, mothers with a high sense of self-efficacy may be less likely to have others assist in providing care for their child and may frequently attempt to complete daily tasks for their child independently. Study findings provide additional support for the influence of parental self-efficacy on parenting behaviors (Ardelt & Eccles, 2001; Bogenschneider, Small, & Tsay, 1997; Bohlin & Hagekull, 1987; Dumka et al., 1996; Gondoli & Silberberg, 1997; Hill & Bush, 2001; Izzo et al., 2000; MacPhee, Fritz, & Miller-Heyl, 1996; Shumow & Lomax, 2002). Parenting stress has also been shown to have consistent negative effects on parenting behaviors through the more frequent display of control-oriented behaviors and the lack of positive and mutually responsive interactions between parents and children (Belsky et al., 1996; Deater-Deckard & Scarr, 1996; Fox & Gelfand, 1994). Once again, as p-values were adjusted to account for multiple tests, the interactions were no longer significant. Additional research is needed with a larger sample size to support or disconfirm these initial findings.

Mothers involved in this study reported a relatively high level of parental self-efficacy. The possible range of efficacy scores was 7 to 42, with higher scores indicating a greater sense of parental competence. Though information is not available regarding clinical cut-off scores for this measure, the mean parental self-efficacy rating for this sample was 33.42 (range = 24 to 41) which indicates that mothers felt confident and competent in their ability to handle their child's problems and cope during difficult situations. It is important to note that data for the PSOC-Efficacy subscale was not normally distributed. Concerns regarding the discriminant validity for parental self-efficacy self-report measures have been noted. In a study conducted by Conrad, Gross, Fogg, and Ruchala (1992), no significant direct correlation between maternal self-efficacy and mother-toddler interaction were found. However, when maternal developmental knowledge was taken into consideration, mothers with the highest levels of knowledge and parenting self-efficacy were observed to have the most positive mother-toddler interactions. Mothers with the lowest level of developmental knowledge, who still reported high parental self-efficacy, were found to have the least positive interactions with their children. This finding suggests that parental reports of self-efficacy may be biased, which may reduce measurement validity and the likelihood of detecting significant effects (Jones & Prinz, 2005).

In spite of this shortcoming, parental self-efficacy for parents of children born premature may be consistent with that reported by parents of children born full-term. Spielman and Taubman – Ben-Ari (2009) examined how the birth of a premature child affects perceptions of parental self-efficacy for parents of children born premature in comparison to children born full-term. No differences were found between the two groups for parental self-efficacy. The Spielman and Taubman – Ben-Ari study included parents of premature children who did not face life-threatening medical conditions. Parents in this present study also had children that had been

discharged from the hospital and were receiving care in their home. It is possible that mothers may have reported reduced self-efficacy levels if their child faced a life-threatening medical condition, spent an extended amount of time in the hospital, or if their child is currently receiving follow-up care for a variety of medical conditions, thus affecting the moderational effect of parental self-efficacy in the proposed model.

*Link to Existing Theory*

Ecological systems theory acknowledges that child development is influenced by the dynamic interplay between the child, the family, and the many environments and systems in which these parties function (Bronfenbrenner, 1979). Specifically, the child is located at the center of multiple systems (i.e., microsystem, mesosystem, exosystem, macrosystem, and chronosystem) of influence. Each child carries a unique set of characteristics and behaviors that interact with individuals and environmental factors over time to impact their development. Interactions between a child and his or her parent has significant implications for a child's growth and development and reasons as to why some premature children are more resilient than others may lie in the exchanges between a child and parent (Kuczynski, 2003). Just as specific child characteristics (e.g., behavioral needs, medical concerns) influence the manner in which parents interact with and respond to their child, ecological theories of child development emphasize that parent characteristics (e.g., psychological well-being, perceptions of support) also have a direct influence on how parents interact with their children (Mahoney & Wheeden, 1997).

Parental stress has been shown to impact parenting behaviors by influencing the amount of positive, supportive, and mutually responsive behaviors that are displayed. As was shown in this investigation, parenting stress influenced the extent to which mothers allowed family members to assist in providing care for their child and the number of events that a child

participated in on a daily basis. Parental self-efficacy has also been shown to influence child development and a parent's ability to provide a supportive and enriching environment to facilitate child growth and well-being over time. Parental self-efficacy has been shown to influence a parents' responsiveness toward their child (Donovan & Leavitt, 1985; Donovan et al., 1997); ability to establish an adaptive, stimulating, and nurturing child-rearing environment (Coleman & Karraker, 2000); and acceptance of their child's needs (Dumka et al., 1996). Social cognitive theory recognizes that individual cognitions are the primary factor in determining one's ability to control one's own behavior and parental self-efficacy is best understood from a social cognitive framework.

Social cognitive theory recognizes that personal factors (e.g., cognitions, biological events), behaviors (e.g., warmth and supportive parenting), and environmental influences (e.g., access to health care providers, community supports to promote positive parenting) interact to influence individual functioning (Bandura, 1986). Social cognitive theory posits that beliefs of self-efficacy are the motivating factor behind one's actions; unless individuals believe they are able to produce positive outcomes through their behavior, it is unlikely they will feel motivated to overcome personal difficulties. Parent and child behaviors can contribute to a parents' evaluation of the behaviors they display with their child which can either increase or decrease parental self-efficacy.

People with high beliefs in their capabilities will approach challenging tasks as experiences to be mastered rather than threats to be avoided. Such individuals will set demanding goals for themselves, maintain a strong commitment to accomplishing them, are likely to persist in the face of failure, and quickly recover their sense of efficacy after enduring failure or setbacks (Bandura, 1994). Mothers in this study with high parental self-efficacy were

found to be more accepting of their child's misbehavior and were more likely to create consistent and predictable schedules for their children, take advantage of community services and resources, and create safe environments at home for their children. Bandura's social cognitive theory has important implications for understanding the behaviors that parents will exhibit during interactions with premature children, along with how likely families are to take advantage of community resources that can contribute to parental well-being and child growth and development.

Transactional theory (Sameroff & Chandler, 1975) recognizes that children and the parent-child relationship are located within the family context and develop in a reciprocal, bidirectional manner over time. The child and their environment both make unique contributions toward obtaining developmental outcomes and the manner in which interchanges occur between parents and children over time (Sameroff, 1975; Sameroff & Chandler, 1975). This is particularly relevant for the interaction sequences among parents and children born premature. Through the model investigated in this study, outcomes are explained as the mutual effect of context on child and child on context. Results from this study contribute to findings supported by the transactional theory as child and parent characteristics were found to impact the home environment and specific behaviors (i.e., acceptance of child, organization of the home environment, and variety in experience) displayed by parents in this setting.

Ecological, social cognitive and transactional theories provide a framework for understanding the various contexts in which children develop and the effect of parental well-being, beliefs, and behaviors on child functioning. Findings from this study aid in understanding the unique experience of parenting a premature child, parental characteristics that impact parenting behaviors, and their effect on child outcomes. It is important to keep in mind the

unique features of this sample that were mentioned previously, along with limitations to this study that will be mentioned in the following section.

### *Limitations*

This study provided unique information about the relationship between medical risk and parenting stress, and the moderating influence of parental self-efficacy on medical risk, parenting stress, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement) and the home environment (i.e., organization of the environment, learning materials, variety in experience, and IT-HOME total score) of children born premature. Specific limitations regarding design and internal validity, external validity and generalizability, analyses and statistical power, and measurement are discussed in the following section.

*Design and internal validity.* Data for parental stress, parental self-efficacy, specific parenting behaviors (i.e., parental responsiveness, acceptance of child, parental involvement), and the home environment (organization of the environment, learning materials, IT-HOME) examined in this study were not normally distributed. The influence of psychosocial risk factors was not investigated in the proposed model. Psychosocial variables that have been shown to moderate parental stress and self-efficacy among parents of premature children such as socioeconomic status (Cronin et al., 1995; Siefert, Thompson, Ten Benschel, & Hunt, 1983) and parental age and education (Zahr, 1993) were not explored in this investigation. Further research on moderating variables, marital status, presence of social support, previous experience with premature births, and current medical needs of premature children is needed to better understand the complex relationship among factors that influence parent and child well-being.

*External validity and generalization.* Participants in this study were children and families currently enrolled in a NICU developmental follow-up program. External validity of findings



are limited to families of premature children that are enrolled in a developmental follow-up program and study findings cannot be generalized to families of all premature children as only those enrolled in this specific follow-up program were included in this study. Though all families were provided with information on the TIPS developmental follow-up program when they were discharged from the NICU, factors that differentiate families who accept invitations to participate in the TIPS clinic from those who decline are unknown. Transportation difficulties, work problems, or lifestyle conflicts may make it difficult for some families to participate even when an infant's risk is known to be high. Such families may experience needs targeted by NICU follow-up programs but fail to enroll in the program. There was also a large gap in time between children's discharge from the hospital and their participation in this study. Thus, study findings cannot be generalized to all families with premature children or even those who participate in developmental follow-up programs.

*Sample size and statistical power.* Prior to conducting this study, a power analysis was conducted to determine an adequate sample size from parent-child dyads currently enrolled in the TIPS program. With medium effect sizes taken into consideration, a sample size of 70 was considered to be sufficient for detecting significant results. This study had a sufficient sample size with 72 participants included. The effect sizes detected in this study were smaller than expected, smaller than medium effect sizes, based on previous literature. Replication of study findings with a larger sample may strengthen results and help uncover relationships among study variables.

*Correlational analyses.* Correlational analyses were used to examine relationships between study variables. While correlational analyses can suggest relationships between variables of interest, they cannot prove that one variable causes a change in another variable.

Such analyses simply measure the extent to which two variables are related as other variables may influence study findings. As a result, it is important to note that a significant relationship among variables of interest does not imply causation. Examining the influence of potential moderating variables can assist in elucidating study findings and providing more specific points of intervention for early intervention professionals.

*Measurement.* The NICU medical history index was developed for the purposes of this investigation and as a result psychometric properties are not available. A potential reporting bias exists with regard to the extent to which caregivers report feelings of stress and self-efficacy. Data for parenting stress and self-efficacy were skewed, suggesting that this sample may differ from normative groups. It is possible that caregivers in this sample are unique in comparison to other groups studied; however, this information is difficult to determine in light of possible reporting biases.

The IT-HOME Inventory is scored based on the presence of specific objects or behaviors exhibited by parents during a one-time in-home observation. The measure does not provide information on the quality or quantity of specific parenting behaviors which may limit the extent to which the behaviors most frequently exhibited by a child's caregivers are captured. Additional analyses were conducted for the IT-HOME Inventory using the sample involved in this investigation<sup>4</sup>. When a CFA was conducted, data yielded good model fit for the overall IT-HOME, however the Organization of Environment and Variety in Experience scales had factors that loaded poorly onto each subscale, as shown in Appendix C. This information raises uncertainty for the validity of both of these factors as well as the interpretation of the moderation

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<sup>4</sup> Results from all of the models demonstrate acceptable overall fit (CFI > .90, RMSEA < .08). Results from the item loadings indicate that three of the five factors on the Variety in Experience subscale and three of the six factors on the Organization of the Environment subscale were below 0.50 suggesting that items loaded poorly on these scales, suggesting poor reliability, and that these constructs are not well measured.

analyses. Given these limitations, all implications based on this study's findings must be made with caution. The following section provides direction for future research considering the findings and limitations of this study.

#### *Future Research Directions*

Results from this study provide many promising avenues for future research. This study was the first to investigate the extent to which parental self-efficacy moderates the relationship between medical risk, parenting stress, specific parenting behaviors, and the home environment of premature children. Findings indicate that parental self-efficacy influences the extent to which parents of premature children accept their child's misbehavior, organize their child's environment, and provide variety in their child's daily life. The NICU medical history index developed for this investigation is a promising tool for identifying the medical needs that a child experiences while in the NICU and following hospital discharge. As various medical factors have been shown to influence parent-child interactions, particularly among parents of children born premature, it is important to note child medical characteristics that may increase parent's susceptibility to negative interaction patterns with their children. Such information is essential for intervention planning and focusing treatment efforts towards families who may be likely to exhibit impaired interactions with their children. Replication is therefore needed to determine how medical risk influences parenting behaviors and other areas of psychological functioning.

The PSOC and IT-HOME is in need of additional investigation among parents of children born premature. Both measures have been shown to provide scores that have strong internal consistency and reliability estimates for a variety of child populations (Caldwell & Bradley, 1984; Johnston & Mash, 1989, Lovejoy et al., 1997); however, the psychometric qualities of the IT-HOME were called into question with this study. Additional research is

needed to determine whether these tools effective at differentiating among parents of premature children with varying levels of self-efficacy, parenting behaviors, and home environments. Research examining potential predictors of parental self-efficacy, behaviors, and home environments and their relationship to parental adjustment, cognitions, and other areas of psychological functioning for parents of premature children is needed. Further research is also needed to understand the many pathways by which parental self-efficacy influences parent behaviors and child outcomes. Identifying positive influences that increase parents' perceptions of their ability to parent effectively, as well as promote competent parenting practices, may greatly improve parent-child interactions and child outcomes. Investigating the possible influences related to the high levels of self-efficacy for caregivers in this sample may elucidate factors that are in need of further examination.

Information for this study was collected from a diverse sample of child and family participants. Future studies would benefit from investigating the relationships in question with a homogenous sample. For example, it is possible that different results would be obtained if only infants were included or if a greater number of parents were from low-income environments. A quarter of children involved in this study were part of multiple birth sets. Parents of multiples may be expected to have increased levels of stress, particularly if their child was born premature and experienced medical needs. All families were enrolled in a NICU follow-up program. Comparing results with families who declined to participation in the NICU follow-up program used in this study would assist in clarifying study findings and identifying characteristics that led to unique outcomes for both groups.

Longitudinal study designs would assist in determining the extent to which levels of parental stress and efficacy fluctuate over time. Parental stress and self-efficacy may change as

the length of time from hospital discharge increases, as medical concerns persist, or as a parent gains more familiarity and experience with his or her child's medical needs. Medical conditions that a child experienced while in the NICU and following hospital discharge were combined, thus we are unable to determine whether parents involved in this study experienced greater psychological concern while in the NICU or following hospital discharge. It may also be the case that family resources or stressors change over time and by continuing to examine child and family risk, as well as protective factors, health care providers will possess better understanding of family needs and target family concerns more effectively.

Replication of this study with information obtained through direct observation of parenting behaviors is needed. The IT-HOME contains subscales with both self-report and observational items. Though observation items create a majority of the items used in this scale, collecting direct observation data on parenting behaviors examined in this study would reduce the possibility of reporter bias, and would aid in understanding the extent to which parents display warm, sensitive, and responsive behaviors with their child. This information could be used to inform intervention efforts and family treatment planning.

The identification of additional predictive and moderating variables that influence parent behaviors and child outcomes is warranted. Predictive variables may include maternal educational level, employment status, and age at birth of first child. Moderating variables such as number of children in the home, paternal support, and requirement of additional care following NICU discharge could also be investigated to clarify study findings and the extent to which results persist across different families. Investigating factors that may protect against the adverse effects of prematurity, such as socio-economic status, professional support, parental competence, and use of coping strategies, may also help to identify methods for minimizing the

adverse effects of medical risk and parenting stress. Additional information describing the pathways by which medical risk and parenting stress exert their influence on specific child outcomes such as language development and cognitive skills will also be beneficial.

This study contributes to the literature base that seeks to understand the effects of prematurity on children and families. In addition to understanding the harmful effects of prematurity and parenting stress on parenting behaviors, this study also identified a possible mechanism by which the negative effects of both of these factors may be reduced. As the incidence of premature births does not appear to be decreasing, future research that assists in identifying protective factors that can be incorporated into service delivery and intervention planning will aid in reducing the harmful effects of prematurity on children and families. Specific implications for practice based on the findings from this study are discussed in the following section.

#### *Implications for Practice*

Results from this study have important implications for NICU follow-up programs, early intervention service providers, developmental physicians and psychologists, and NICU medical staff. Findings provide insight for the many pathways by which child and parent characteristics interact to influence parenting behaviors. Understanding the extent to which parent and child characteristics influence parental behaviors is critical as specific characteristics, such as stress and child health, often have an enduring influence on child and family functioning and well-being. Examining the role of parental self-efficacy is essential to understanding parental behaviors and potential methods for promoting positive parent-child relationships. Although parental self-efficacy was found to moderate only some of the parenting behaviors included in this study, findings from this study highlight the potential role of parental self-efficacy in

reducing the negative effects of medical risk and parental stress and promoting positive outcomes for children born premature.

Families in this study reported relatively low levels of parenting stress, high levels of parenting self-efficacy, and exhibited a number of positive behaviors during interactions with their children. It is important to convey to parents that while the birth of a premature child may be a stressful and anxiety-producing experience, interventions such as those provided through the TIPS program, are available to assist in alleviating parental stress and enhancing parental self-efficacy during this difficult period. Building strengths in light of demanding circumstances will assist in improving parent well-being, which in turn can engender positive outcomes for a child. Low levels of parental self-efficacy were found to predict the extent to which mothers of children with increased medical needs accessed community resources. Connecting families with early intervention and mental health services can help to improve the mental health status of caregivers, and can assist in promoting positive child outcomes.

The measures used in this study provided useful information for determining the degree to which parents reported stress in their role as a parent and the extent to which they provided a stimulating and supportive home environment for their child. For health care providers working with parents of young children who experience medical impairments, it is important to recognize the harmful effects of stress on parent well-being. It is also important to recognize how a child's home environment may exacerbate or reduce the negative effects of their health condition so that supports and intervention plans may be put in place to support caregivers. Both the PSI and IT-HOME Inventory have been factor analyzed which would also allow clinicians to administer specific subscales that are most pertinent to a family with whom they are working. By identifying mental health needs in long-term developmental follow-up programs, such as the one

involved in this study, clinicians can help identify and target families who need further assistance securing resources and community support.

Early intervention service providers in the field of medicine and psychology have the unique opportunity to intervene at critical time points to reduce the adverse effects of prematurity for children and families. Utilizing developmental follow-up clinics after hospital discharge is associated with increased use of early intervention services (Tien et al., 2002). The timing of contact with different individuals who represent various service agencies can also be critical in determining service use. As different agencies are often represented in NICU follow-up clinics, clinical staff can provide information and assistance accessing outside services, coordinating early intervention delivery, and helping families collaborate with hospital and community service groups. The early years are critical for identifying children and families at risk for negative outcomes and providing support and effective intervention strategies that can enhance parental self-efficacy, positive parent-child relationships, and child development. Concluding remarks summarizing the purpose of the study and the implications of study findings are discussed in the following section.

### *Conclusion*

The purpose of this study was to examine the relationship between medical risk and parenting stress and the moderational role of parental self-efficacy between medical risk, parental stress, specific parenting behavior constructs (i.e., parental responsiveness, acceptance of child, organization of the environment, learning materials, parental involvement, and variety in experience) and the home environment for premature children. Results suggested that medical risk was not significantly related to parenting stress. In the moderation model, parental self-efficacy was found to moderate the relationship between medical risk and acceptance of child



and organization of the environment, and between parenting stress and variety in experience. These results suggest that parental self-efficacy partially moderates the relationship between medical risk, parenting stress, and specific parenting behaviors for families in this study. These findings are unique in that no other studies to date have examined the moderating influence of parental self-efficacy on medical risk and parenting stress for premature children. Very few studies have also focused on the period between hospital discharge and the first 18 months of an infant's life (Olshtain-Mann & Auslander, 2008). Based on these results, it appears that parental self-efficacy has important implications for the behaviors exhibited by parents of children born premature. However, conclusions drawn from this study must be made with care in light of possible limitations from this study.

This study investigated child medical risk, self-reported levels of parental stress, self-efficacy, and behaviors exhibited by parents in the home environment. It is important to note that parents did not report an increased level of parenting stress and reported relatively high levels of self-efficacy. This suggests that there are unique factors related to this sample, such as socio-economic status, education level, and enrollment in a NICU developmental follow-up program, that may influence findings obtained for this sample and are worthy of further examination. Children enrolled in this study also did not experience a great number of medical risk factors while in the hospital and following hospital discharge. Observing positive growth and development in children may strengthen self-efficacy for any parent, particularly those with children who begin life under tenuous circumstances. In addition, limitations such as possible response bias, length of time from NICU discharge, and age range of child participants may have influenced study findings. Thus, findings obtained from this study should be interpreted with caution.

Results for this study may be viewed as meaningful and encouraging for premature children and their families. Previous studies involving parents of premature children often focus on the hospitalization period or the long-term effects of prematurity (Olshtain-Mann & Auslander, 2008). This study extends the literature by examining factors that may enhance or derail the development of premature children and healthy family functioning and by focusing on parental adaptation to premature birth beyond the neonatal period. Few studies have examined parental self-efficacy as a moderator of risk factors associated with parental functioning (Jones & Prinz, 2005), and this study highlights the positive role that parental self-efficacy has for mothers of children born premature and the connection between parental self-efficacy and parent psychological functioning.

The early years for children born premature and their families often consists of a road that is long and complex. An infant's discharge from the NICU does not signify the resolution of health problems or developmental concerns. Increased survival rates of premature children have been accompanied by important improvements in their medical care. Corresponding advances need to be made with regard to family services to promote healthy outcomes for premature children and their families. Physicians and developmental service providers must be aware of burdens experienced by these families over time so that appropriate advice and referrals can be provided to ensure optimal family functioning and appropriate long-term care of premature children.

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Appendix A  
Parent Report Measures

Section A. NICU Medical History Index

Section B. Family Demographic Questionnaire

Section C. Parenting Stress (*Parenting Stress Index-Short Form*)

Section D. Parenting Self-Efficacy (*Parenting Sense of Competence Scale*)



# Parenting a Child with a NICU Experience



## PARENT PACKET

Please answer the following questions to the best of your ability. All information you provide will be kept confidential. There are no right or wrong answers to questions. The information you provide will help us better understand you and your child. Thank you very much for your help!!

CHILD NAME \_\_\_\_\_

CHILD BIRTHDATE \_\_\_\_\_

CHILD'S AGE \_\_\_\_\_

PARENT NAME \_\_\_\_\_  
(the one completing the survey)

ID # \_\_\_\_\_

CLINIC SITE \_\_\_\_\_

DATE \_\_\_\_\_

**Section A. Child Health**

1. What is your child’s gender? (Please check one.)      \_\_\_\_\_Male      \_\_\_\_\_Female
  
2. What do you consider the child’s race? (please check one)
 

_____ White, non-Hispanic	_____ American Indian/ Alaska Native
_____ White, Hispanic or Latino	_____ Asian American
_____ Black/African American	_____ Native Hawaiian or other Pacific Islander
_____ Other Please specify _____	
  
3. What was your child’s **due** date?    \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ (month/ day/ year)
  
4. What is your child’s **birth** date?    \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_ (month/ day/ year)
  
5. What is your child’s **current** age?    \_\_\_\_\_years    \_\_\_\_\_months
  
6. What was your child’s weight at birth?    \_\_\_\_\_ pounds    \_\_\_\_\_ ounces
  
7. How many days did your child spend in the NICU at birth?    \_\_\_\_\_ days
  
8. Has your child ever received supplemental oxygen?    \_\_\_\_\_ Yes    \_\_\_\_\_ No
  
9. How many days did your child receive oxygen assistance since birth?    \_\_\_\_\_ days (best guess is fine)
  
10. Has your child experienced any of the following medical conditions? Please check all that apply. Then, please check which, if any, conditions require on-going care (e.g., medications, therapies, other services).

Please check all conditions your child has experienced prior to their discharge from the NICU.	If present, did condition require additional treatments or evaluations following NICU discharge?	
	Yes	No
_____ Cardiac (heart) impairments		
_____ Delayed growth (e.g., height, weight, head size, etc.)		
_____ Genetic conditions (please specify: _____)		
_____ Failed hearing screening		
_____ Infections during NICU stay (e.g., sepsis)		
_____ Respiratory (breathing) impairments		
_____ Surgery (please specify: _____)		
_____ Vision impairments (e.g., ROP)		
_____ Others (please specify: _____)		



13. Please list the names, ages, gender, and birth status of all the children in your home (start with your oldest child).

Name	Age	Sex (circle) M= Male F= Female	Born premature (circle) Y = Yes N = No
		M or F	Y or N
		M or F	Y or N
		M or F	Y or N
		M or F	Y or N
		M or F	Y or N
		M or F	Y or N
		M or F	Y or N

14. What is your current work status? (Please provide an answer for each option.)

Working full-time (30 or more hours/week)	Yes	No
Working part-time (less than 30 hours/week)	Yes	No
Unemployed	Yes	No
Looking for work	Yes	No
Laid off	Yes	No
In school/ training (full-time)	Yes	No
In school/ training (part-time)	Yes	No
In military	Yes	No
Other Please specify: _____		

15. In the **month before** you found out you were pregnant, what was the **typical** number of cigarettes you would have smoked **per day**?

- \_\_\_\_\_ I do not smoke
- \_\_\_\_\_ < 1 per day (e.g. does not smoke everyday, and when does smoke, 3 cigarettes on one occasion, less than twice a week)
- \_\_\_\_\_ 1-3 cigarettes per day
- \_\_\_\_\_ 4-7 cigarettes per day
- \_\_\_\_\_ About a half pack (8-12 cigarettes per day)
- \_\_\_\_\_ Between a half pack and a pack per day (13-18 cigarettes per day)
- \_\_\_\_\_ About a pack a day (18—23 cigarettes per day)
- \_\_\_\_\_ Between a pack and 2 packs per day (24-35 cigarettes per day)
- \_\_\_\_\_ 2 packs or more per day (36+ cigarettes per day)



21. In your **third trimester**, what was the **typical** number of drinks you would consume **per day**?

- I do not drink/did not drink in third trimester  
 < 1 per day (e.g. does not drink everyday, and when does drink, 3 drinks on one occasion, less than twice a week)  
 1-3 drinks per day  
 3-5 drinks per day  
 More than 5 drinks per day

22. Did you quit drinking during your pregnancy?  Yes\*  
 No  
 I do not drink

22a. \*If so, when did you quit drinking (please list month of pregnancy): \_\_\_\_\_

23. In the **month before** you found out you were pregnant, did you use recreational drugs?

- Yes  
 No  
 I do not use recreational drugs

24. After you found out you were pregnant, did you use recreational drugs?

- Yes  
 No  
 I do not use recreational drugs

25. In your **third trimester**, did you use recreational drugs?

- Yes  
 No  
 I do not use recreational drugs

26. Did you quit using recreational drugs during your pregnancy?  Yes\*  
 No  
 I do not use recreational drugs

26a. \*If so, when did you quit using recreational drugs (please list month of pregnancy): \_\_\_\_\_

27. Have you even been diagnosed with a psychological condition? (please check one)  Yes  No

- If so, which condition(s):  Anxiety Disorders  
 Attention-deficit/hyperactivity disorder (ADHD)  
 Bipolar Disorder  
 Depression  
 Eating Disorder  
 Obsessive-Compulsive Disorder  
 Schizophrenia  
 Other Please specify \_\_\_\_\_

28. Thinking about all the sources of income you and your family received (e.g., child support, federal assistance), what was the total income for your household **last year** (your best guess is fine):

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> \$8,000 or less     | <input type="checkbox"/> \$8,001 - \$12,000  | <input type="checkbox"/> \$12,001 - \$15,000 |
| <input type="checkbox"/> \$15,001 - \$18,000 | <input type="checkbox"/> \$18,001 - \$20,000 | <input type="checkbox"/> \$20,001 - \$23,000 |
| <input type="checkbox"/> \$23,001 - \$25,000 | <input type="checkbox"/> \$25,001 - \$28,000 | <input type="checkbox"/> \$28,001 - \$30,000 |
| <input type="checkbox"/> \$30,001 - \$33,000 | <input type="checkbox"/> \$33,001 - \$35,000 | <input type="checkbox"/> \$35,001 - \$38,000 |
| <input type="checkbox"/> \$38,001 - \$40,000 | <input type="checkbox"/> \$40,001 - \$43,000 | <input type="checkbox"/> \$43,001 - \$45,000 |
| <input type="checkbox"/> \$45,001 - \$48,000 | <input type="checkbox"/> \$48,001 - \$50,000 | <input type="checkbox"/> over \$50,000       |

29. Is your child’s health care currently covered by a health insurance program?

Yes  No

30. If so, which program(s):

- Medicaid
- Private Insurance
- Combination of Medicaid and Private Insurance
- Other Please specify \_\_\_\_\_

31. Please indicate how helpful each of the following people/resources has been to you in terms of raising your child **over the past 3 to 6 months**.

	<b>Not very helpful</b>	<b>Somewhat helpful</b>	<b>Very helpful</b>	<b>Not applicable/ Don’t know</b>
a. Child’s (father/partner)	1	2	3	4
b. Grandparents or other relatives	1	2	3	4
c. Your friends	1	2	3	4
d. Co-workers	1	2	3	4
e. Professional helpgivers like counselors or social workers	1	2	3	4
f. Child care providers	1	2	3	4
g. Religious or social group member	1	2	3	4
h. Anyone else? (please specify): _____	1	2	3	4

**Section C. Parenting**

Read each statement carefully. For each statement, please circle the response that best represents your opinion. While you may not find a response that exactly states your feelings, please circle the response that comes closest to describing how you feel. **YOUR FIRST REACTION TO EACH QUESTION SHOULD BE YOUR ANSWER.** Circle only one response for each statement, and respond to all statements.

<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Not Sure</b>	<b>Agree</b>	<b>Strongly Agree</b>

1.	I often have the feeling that I cannot handle things very well.	0	1	2	3	4
2.	I find myself giving up more of my life to meet my children's needs than I ever expected.	0	1	2	3	4
3.	I feel trapped by my responsibilities as a parent.	0	1	2	3	4
4.	Since having this child, I have been unable to do new and different things.	0	1	2	3	4
5.	Since having this child, I feel that I am almost never able to do things that I like to do.	0	1	2	3	4
6.	I am unhappy with the last purchase of clothing I made for myself.	0	1	2	3	4
7.	There are quite a few things that bother me about my life.	0	1	2	3	4
8.	Having a child has caused more problems than I expected in my relationship with my spouse/partner.	0	1	2	3	4
9.	I feel alone and without friends.	0	1	2	3	4
10.	When I go to a party, I usually expect not to enjoy myself.	0	1	2	3	4
11.	I am not as interested in people as I used to be.	0	1	2	3	4
12.	I don't enjoy things as I used to.	0	1	2	3	4
13.	My child rarely does things for me that make me feel good.	0	1	2	3	4
14.	Sometimes I feel my child doesn't like me and doesn't want to be close to me.	0	1	2	3	4
15.	My child smiles at me much less than I expected.	0	1	2	3	4

---



0	1	2	3	4
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Not Sure</b>	<b>Agree</b>	<b>Strongly Agree</b>

16.	When I do things for my child, I get the feeling that my efforts are not appreciated very much.	0	1	2	3	4
17.	When playing, my child doesn't often giggle or laugh.	0	1	2	3	4
18.	My child doesn't seem to learn as quickly as most children.	0	1	2	3	4
19.	My child doesn't seem to smile as much as most children.	0	1	2	3	4
20.	My child is not able to do as much as I expected.	0	1	2	3	4
21.	It takes a long time and it is very hard for my child to get used to new things.	0	1	2	3	4
22.	<b>For the next statement, choose your response from the choices "1" to "5" below.</b> I feel that I am: 1. not very good at being a parent 2. a person who has some trouble being a parent 3. an average parent 4. a better than average parent 5. a very good parent	1	2	3	4	5
23.	I expected to have closer and warmer feelings for my child than I do and this bothers me.	0	1	2	3	4
24.	Sometimes my child does things that bother me just to be mean.	0	1	2	3	4
25.	My child seems to cry or fuss more often than most children.	0	1	2	3	4
26.	My child generally wakes up in a bad mood.	0	1	2	3	4
27.	I feel that my child is very moody and easily upset.	0	1	2	3	4
28.	My child does a few things that bother me a great deal.	0	1	2	3	4
29.	My child reacts very strongly when something happens that my child doesn't like.	0	1	2	3	4
30.	My child gets upset easily over the smallest thing.	0	1	2	3	4
31.	My child's sleeping or eating schedule was much harder to establish than I expected.	0	1	2	3	4

0	1	2	3	4
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Not Sure</b>	<b>Agree</b>	<b>Strongly Agree</b>

32.	<p><b>For the next statement, choose your response from the choices “1” to “5” below.</b></p> <p>I have found that getting my child to do something or stop doing something is:</p> <ol style="list-style-type: none"> <li>1. much harder than I expected</li> <li>2. somewhat harder than I expected</li> <li>3. about as hard as I expected</li> <li>4. somewhat easier than I expected</li> <li>5. much easier than I expected</li> </ol>	1	2	3	4	5
33.	<p><b>For the next statement, choose your response from the choices “10+” to “1-3.”</b></p> <p>Think carefully and count the number of things which your child does that bother you. For example: dawdles, refuses to listen, overactive, cries, interrupts, fights, whines, etc.</p>	10+	8-9	6-7	4-5	1-3
34.	There are some things my child does that really bother me a lot.	0	1	2	3	4
35.	My child turned out to be more of a problem than I had expected.	0	1	2	3	4
36.	My child makes more demands on me than most children.	0	1	2	3	4

Abidin, R. R., (1995). *Parenting Stress Index-Third Edition: Professional Manual*. Lutz, FL: Psychological Assessment Resources, Inc

**Section D. Parenting Beliefs**

Please read each statement and indicate the response that matches your feelings.

1	2	3	4	5	6				
<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Somewhat Disagree</b>	<b>Somewhat Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>				
1.	The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.			1	2	3	4	5	6
2.	Even though being a parent could be rewarding, I am frustrated now while my child is at his/her present age.			1	2	3	4	5	6
3.	I go to bed the same way I wake up in the morning, feeling like I have not accomplished a whole lot.			1	2	3	4	5	6
4.	I do not know why it is, but sometimes when I'm supposed to be in control, I feel like the one being manipulated.			1	2	3	4	5	6
5.	My mother was more prepared to be a good mother than I am.			1	2	3	4	5	6
6.	I would make a fine model for a new mother to follow, in order to learn what she would need to know in order to be a good parent.			1	2	3	4	5	6
7.	Being a parent is manageable, and any problems are easily solved.			1	2	3	4	5	6
8.	A difficult problem in being a parent is not knowing whether you're doing a good job or a bad one.			1	2	3	4	5	6
9.	Sometimes I feel like I'm not getting anything done.			1	2	3	4	5	6
10.	I meet my own personal expectations for expertise in caring for my child.			1	2	3	4	5	6
11.	If anyone can find the answer to what is troubling my child, I am the one.			1	2	3	4	5	6
12.	My talents and interests are in other areas, not in being a parent.			1	2	3	4	5	6
13.	Considering how long I've been a mother, I feel thoroughly familiar with this role.			1	2	3	4	5	6
14.	If being a mother of a child were only more interesting, I would be motivated to do a better job as a parent.			1	2	3	4	5	6
15.	I honestly believe that I have all the skills necessary to be a good mother to my child.			1	2	3	4	5	6
16.	Being a parent makes me tense and anxious.			1	2	3	4	5	6
17.	Being a good mother is a reward in itself.			1	2	3	4	5	6

Johnston, C., & Mash, C.J. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology, 18*, 167-175.

Appendix B  
Parent Behaviors and Home Environment

Section A. Infant/Toddler HOME Inventory Protocol

### Infant/Toddler HOME Inventory Protocol

Family name \_\_\_\_\_ Date \_\_\_\_\_ Visitor \_\_\_\_\_

Address \_\_\_\_\_ Phone \_\_\_\_\_

Child's name \_\_\_\_\_ Birth date \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_

Parent present \_\_\_\_\_ If other than parent, relationship to child \_\_\_\_\_

Family composition \_\_\_\_\_  
(persons living in household, including sex and age of children)

Family \_\_\_\_\_ Language \_\_\_\_\_ Maternal \_\_\_\_\_ Paternal \_\_\_\_\_  
Ethnicity \_\_\_\_\_ Spoken \_\_\_\_\_ Education \_\_\_\_\_ Education \_\_\_\_\_

Is mother employed? \_\_\_\_\_ Type of work when employed? \_\_\_\_\_

Is father employed? \_\_\_\_\_ Type of work when employed? \_\_\_\_\_

Other person(s) present during visit \_\_\_\_\_

Comments \_\_\_\_\_

#### SUMMARY

Subscale	Score	Lowest Fourth	Middle Half	Upper Fourth
I. RESPONSIVITY		0 – 6	7 – 9	10 – 11
II. ACCEPTANCE		0 – 4	5 – 6	7 – 8
III. ORGANIZATION		0 – 3	4 – 5	6
IV. LEARNING MATERIALS		0 – 4	5 – 7	8 – 9
V. INVOLVEMENT		0 – 2	3 – 4	5 – 6
VI. VARIETY		0 – 1	2 – 3	4 – 5
TOTAL SCORE		0 – 25	26 – 36	37 - 45

For rapid profiling of a family, place an X in the box that corresponds to the raw score on each subscale and the total score.

### Infant/Toddler HOME DATA FORM

Place a plus (+) or minus (0) in the box alongside each item if the behavior is observed during the visit or if the parent reports that the conditions or events are characteristic of the home environment. Enter the subtotal and the total on the front side of the Record Sheet. **Observation (O), Either (E), or Interview (I) is indicated for each item.**

<b>I. RESPONSIVITY</b>		24. Child has a special place for toys and treasures. <b>E</b>	
1. Parent permits child to engage in "messy" play. <b>I</b>		25. Child's play environment is safe. <b>O</b>	
2. Parent spontaneously vocalizes to child at least twice. <b>O</b>		<b>IV. LEARNING MATERIALS</b>	
3. Parent responds verbally to child's vocalizations or verbalizations. <b>O</b>		26. Muscle activity toys or equipment. <b>E</b>	
4. Parent tells child name of object or person during visit. <b>O</b>		27. Push or pull toy. <b>E</b>	
5. Parent's speech is distinct, clear, and audible. <b>O</b>		28. Stroller or walker, kiddie car, scooter, or tricycle. <b>E</b>	
6. Parent initiates verbal interchanges with Visitor. <b>O</b>		29. Cuddly toy or role-playing toys. <b>E</b>	
7. Parent converses freely and easily. <b>O</b>		30. Learning facilitators – mobile, table and chair, high chair, play pen. <b>E</b>	
8. Parent spontaneously praises at least twice. <b>O</b>		31. Simple eye - hand coordination toys. <b>E</b>	
9. Parent's voice conveys positive feelings toward child. <b>O</b>		32. Complex eye – hand coordination toys. <b>E</b>	
10. Parent caresses or kisses child at least once. <b>O</b>		33. Toys for literature or music. <b>E</b>	
11. Parent responds positively to praise of child offered by Visitor. <b>O</b>		34. Parent provides toys for child to play with during visit. <b>O</b>	
<b>II. ACCEPTANCE</b>		<b>V. INVOLVEMENT</b>	
12. No more than 1 instance of physical punishment during past week. <b>I</b>		35. Parent talks to child while doing household work. <b>I</b>	
13. Family has a pet. <b>E</b>		36. Parent consciously encourages developmental advance. <b>I</b>	
14. Parent does not shout at child. <b>O</b>		37. Parent invests maturing toys with value via personal attention. <b>I</b>	
15. Parent does not express overt annoyance with or hostility to child. <b>O</b>		38. Parent structures child's play periods. <b>I</b>	
16. Parent neither slaps nor spanks child during visit. <b>O</b>		39. Parent provides toys that challenge child to develop new skills. <b>I</b>	
17. Parent does not scold or criticize child during visit. <b>O</b>		40. Parent keeps child in visual range, looks often. <b>O</b>	
18. Parent does not interfere with or restrict child 3 times during visit. <b>O</b>		<b>VI. VARIETY</b>	
19. At least 10 books are present and visible. <b>E</b>		41. Father provides some care daily. <b>I</b>	
<b>III. ORGANIZATION</b>		42. Parent reads stories to child at least 3 times weekly. <b>I</b>	
20. Child care, if used, is provided by one of 3 regular substitutes. <b>I</b>		43. Child eats at least one meal a day with mother and father. <b>I</b>	
21. Child is taken to grocery store at least once a week. <b>I</b>		44. Family visits relatives or receives visits once a month or so. <b>I</b>	
22. Child gets out of house at least 4 times a week. <b>I</b>		45. Child has 3 or more books of his/her own. <b>E</b>	
23. Child is taken regularly to doctor's office or clinic. <b>I</b>			

**TOTALS: I \_\_\_\_ II \_\_\_\_ III \_\_\_\_ IV \_\_\_\_ V \_\_\_\_ VI \_\_\_\_ TOTAL \_\_\_\_**

Appendix C  
Confirmatory Factor Analysis of IT-HOME

Section A. CFA Model Fit Indices  
Section B. Probit Item Factor Loadings

*CFA Model Fit Indices for Evaluating IT-HOME*

	$\Delta\chi^2$ ( $\Delta df$ )	<i>p</i>	$\Delta CFI$	$\Delta RMSEA$
Parental Responsivity	21.68 (27)	.75	>.99	<.01
Acceptance of Child	10.71 (14)	.71	>.99	<.01
Parental Involvement	11.91 (10)	.29	.93	.05
Organization of the Environment	5.29 (10)	.87	>.99	<.01
Learning Materials	21.73 (27)	.75	>.99	<.01
Variety in Experience	7.36 (6)	.29	.94	.06

*Note:*  $\chi^2$  = Chi-Square Test of Exact Fit; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; Liberal guidelines suggest CFI > .90 and RMSEA < .08 are indicative of acceptable overall model fit (Bentler, 1990).



*Probit Item Factor Loadings Across IT-HOME Scales*

	$\hat{\lambda}$	SE
$\hat{\lambda}_{1-11}$ , Parental Responsivity	.72	.09
$\hat{\lambda}_{12-19}$ , Acceptance of Child	.71	.15
$\hat{\lambda}_{35-40}$ , Parental Involvement	.14	.20
$\hat{\lambda}_{20-25}$ , Organization of the Environment	.23	.24
$\hat{\lambda}_{26-34}$ , Learning Materials	.95	.15
$\hat{\lambda}_{41-45}$ , Variety in Experience	.74	.13

Note: Unstandardized and standardized probit factor loadings are identical.